

# THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—33RD YEAR.

SYDNEY, SATURDAY, NOVEMBER 2, 1946.

No. 18.

## Table of Contents.

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES—	Page.	MEDICAL SOCIETIES—	Page.
The Zoological Position of Man, by A. N. Burkitt	613	Melbourne Paediatric Society	644
Some Recent Changes in the Outlook for the Child, by F. V. G. Scholes, C.M.G., M.D., F.R.A.C.P., D.P.H.	617	<b>NAVAL, MILITARY AND AIR FORCE—</b>	
The Modern Treatment of Pulmonary Tuberculosis, by C. H. Fitts	622	Appointments	645
A Portable, Self-Contained Apparatus for the Induction and Maintenance of Continuous Intravenous Anaesthesia, with Some Observations on the Use of "Pentothal Sodium", by Ronald V. Pratt	626	<b>CORRESPONDENCE—</b>	
The Effect of Intravenously Administered Antimony Compounds on Pyogenic Skin Lesions, by A. T. H. Jolly	630	The Basis of Post-Operative Treatment in Appendicitis and Peritonitis	645
<b>REPORTS OF CASES—</b>		Pain in an Amputation Stump Associated with Spinal Anaesthesia	645
A Case of Acquired Hematocolpos in Adolescence due to Trauma in Early Childhood, by Marcus M. Kennedy, M.B., B.S., F.R.C.S.	634	Lumbago	646
<b>REVIEWS—</b>		An Increase in Syphilitic Infections	646
Ocular Prosthesis	636	Some Problems of Backache and Sciatica	646
Veneral Diseases	636	<b>POST-GRADUATE WORK—</b>	
<b>NOTES ON BOOKS, CURRENT JOURNALS AND NEW APPLIANCES—</b>		The Melbourne Permanent Post-Graduate Committee	646
A Tale for Children about the Platypus	636	The Post-Graduate Committee in Medicine in the University of Sydney	646
<b>LEADING ARTICLES—</b>		<b>AUSTRALIAN MEDICAL BOARD PROCEEDINGS—</b>	
The Therapeutic Value of Reading	637	New South Wales	647
<b>CURRENT COMMENT—</b>		Queensland	647
A Clear Light on the Diagnosis and Treatment of Venous Thrombosis	638	Tasmania	647
The Neurocytology of Old Age	639	<b>THE ROYAL AUSTRALASIAN COLLEGE OF PHYSICIANS—</b>	
<b>ABSTRACTS FROM MEDICAL LITERATURE—</b>		Meeting at Melbourne	647
Bacteriology and Immunology	640	<b>THE ROYAL AUSTRALASIAN COLLEGE OF SURGEONS—</b>	
Hygiene	641	Gordon Craig Scholarships	647
<b>BIBLIOGRAPHY OF SCIENTIFIC AND INDUSTRIAL REPORTS—</b>		A Post-Graduate Course in Surgery	647
The Results of War-Time Research	642	<b>OBITUARY—</b>	
<b>BRITISH MEDICAL ASSOCIATION NEWS—</b>		Arthur Francis Kelly	647
Notice	644	<b>NOMINATIONS AND ELECTIONS</b>	648
		<b>CORRIGENDUM</b>	648
		<b>THE FEDERAL MEDICAL WAR RELIEF FUND</b>	648
		<b>MEDICAL APPOINTMENTS</b>	648
		<b>BOOKS RECEIVED</b>	648
		<b>DIARY FOR THE MONTH</b>	648
		<b>MEDICAL APPOINTMENTS: IMPORTANT NOTICE</b>	648
		<b>EDITORIAL NOTICES</b>	648

### THE ZOOLOGICAL POSITION OF MAN.<sup>1</sup>

By A. N. BURKITT,  
Sydney.

My address will be upon certain recent studies of the zoological position of man. I shall first discuss the impact of recent ideas on evolution, speciation and genetics upon our knowledge of the races of living and fossil men, and certain unique features of man will be considered. Then the bearing of these ideas upon the data of physical anthropology will be briefly outlined, and finally I shall continue the discussion of some further unique features of man and briefly refer to their bearing upon social anthropology and upon man's government and future control of himself.

No one man can be singled out as having made the main contributions to the present summary; but undoubtedly the most masterly synthesis of our present knowledge has been made by Julian Huxley in his work "Evolution the Modern Synthesis" (1942), while certain special aspects of the problem were elaborated in his essay on "The Uniqueness of Man" (1946). It seems fitting that this work should have been done by a descendant of Thomas Henry Huxley, Darwin's protagonist, for it was Darwin who first clearly enunciated and discussed the problem in his "Descent of Man" (1871).

Man's recent evolution in the light of modern concepts has been summarized by Dobzhansky (1944), while certain detailed aspects of the problem are given by Weidenreich (1942 *et cetera*) and by Le Gros Clark. Weidenreich's

contributions are outstanding, especially his comparative study of the skull of Peking man. Various parts of the mosaic are being slowly fitted together, and amongst recent discoveries may be mentioned von Koenigswald's discoveries of an aberrant giant type of hominid in south-east Asia and Java, and here in Australia the Keilor skull, found near Melbourne and described by Wunderley, Adam and Mahoney. With regard to Weidenreich's extensive contributions, I feel that occasionally the theories which he puts forward confuse the problem, as the palaeontologist Gaylord Simpson so tersely puts it. This, however, cannot detract from the great debt we owe to Weidenreich for his work on practically all recent fossil "finds" of early man—either his own descriptions or his careful criticism of the findings of others.

Dobzhansky (1944) clearly defines species and race in modern terms, as follows:

A species in sexual cross-fertilizing organisms can be defined as groups of populations which are reproductively isolated to the extent that the exchange of genes between them is absent, or so slow that genetic differences are not diminished or swamped. Races are defined as populations differing in the incidence of certain genes, but actually exchanging or potentially able to exchange genes across whatever boundaries separate them.

Judged by these criteria, modern man is a species consisting of races imperfectly differentiated geographically, or what the modern systematist would call a polytypic species in contrast to a monotypic species (Huxley, 1942). Further, as Huxley clearly put it, his evolution has been reticulate in contrast to the divergent evolution of most other types. By reticulate is meant that after an incipient divergence the branches or races of man from earliest known stages onwards have come together again, have remained interfertile, and have generated new diversity from their Mendelian or genetic recombinations, this pro-

<sup>1</sup> Presidential address to the Section of Anthropology at a meeting of the Australian and New Zealand Association for the Advancement of Science, Adelaide, August, 1946.

cess being repeated until the course of human descent is like a network.

Thus, as Dobzhansky expresses it, at any one particular time level in the Pleistocene, probably only a single hominid species has existed; that is to say, the various so-called species of fossil man which are steadily being discovered have really been races of three successive hominid species, which were evolved vertically (that is, in time) one from the other. These three stages Weidenreich proposes to name as follows: (i) *Homo erectus*, which comprises such races as Peking man, with a side offshoot which may have attained specific level—namely, *Homo giganteus* (*Gigantanthropus*, *Megalanthropus*). (ii) The various forms which included Neanderthal man, and to which various names have been given, such as *Homo intermedius*, or as Weidenreich also calls them, the Neanderthals; into this category come the various Neanderthal skulls, the Rhodesian skull and the Ngandong skulls. Weidenreich has also called this group *Homo primigenius*. He is of opinion that one particular member of the group—namely, *Homo soloensis*—is somewhat more closely related to *Homo erectus* and is thus intermediate between *Homo erectus* and *Homo primigenius*. (iii) *Homo sapiens*, including the races of modern man, and various fossil forms, such as *Cromagnon man et cetera*.

Morant also regarded the various Neanderthals as forming a homogeneous group.

Further, Dobzhansky maintains, and I believe correctly, that the findings of McCown and Keith on the Mount Carmel remains indicate that Neanderthal and modern types could interbreed and thus at that period were races of the same species. These views agree fairly well with those expressed by Weidenreich, and I have adopted his terminology. He states, for instance, that only geographic segregation and none of the several known forms of reproductive isolation kept the different branches of the human species apart from each other.

The most obvious special features of man, evidences of which are found in steadily increasing number in the above series as we approach modern times, are the development of speech and the acquisition of conceptual thought, the use of tools and the development of a cumulative tradition, this latter feature being accelerated by the discovery of writing some 5,000 years ago. These special and unique characteristics are of course correlated with the progressive enlargement of the brain which occurs in the above-mentioned series of fossil man. They have also resulted in man's biological dominance and at the same time have led to another unique feature—namely, the fact that man is the most widely spread animal species in existence. Further, he has maintained this biological dominance within the range of a single species. In this feature man is also unique, when we contrast him with other dominant groups, such as the reptiles in Mesozoic ages or the ants among insects.

This wide spread of man is of course also associated with his migratory propensities, his relative independence of his environment and his omnivorous diet, or at any rate his capacity to adapt himself to widely varying diets. Correlated with this widespread dispersal and steadily increased by the reticulate nature of his evolution is man's variability. As Huxley puts it, in respect to brain, mind and outlook the range from a subnormal member of the most primitive races to a supernormal member of an advanced race, such as Newton, is "assuredly comparable in extent with that between a sponge and a higher mammal".

This feature is of profound importance, and man may be said to vary not only vertically, as in the above comparison, but also laterally, when, for instance, we compare the first-class executive type of mind with the creative type of mind like that of a Beethoven or an Einstein. This variability is not only biological or genetic, but also has superposed the even greater variability due to differences of upbringing, profession and personal tastes.

In summary, man is more variable than other species for two reasons: firstly, because migration has recaptured for the single interbreeding group divergences of a magnitude that in lower animals would have escaped through

isolation of species, and secondly, because the resultant crossing has generated recombinations which both quantitatively and qualitatively are on a far larger scale than is supplied by the internal variability of any other known animal species, no matter how abundant in numbers.

Let us now revert to the brain and skull changes seen in the races of fossil man. Weidenreich put forward the thesis that the increase of brain size entailed a series of structural modifications in the human skeleton, from the skull to the foot bones. He compared the skull of a wolfhound, of a bulldog and of a King Charles spaniel, and showed that a remarkable series of changes could be observed. The brain case in the King Charles spaniel becomes more globular and thinner, the brain expands anteriorly far beyond the coronal suture, even to the medial wall of the orbit, and the olfactory recess disappears. Further, the bony processes concerned with the masticatory apparatus become greatly reduced, the frontal air sinus also disappears, and the jaws and palate become greatly reduced in length and come to lie more beneath the calvarium. The teeth at the same time become reduced in size; a simplification of pattern of individual teeth is observed. Weidenreich also examined other series of skulls, such as those of the cat and lion, of pigmy and ordinary chimpanzees *et cetera*, and finally he compared the changes observed above with those found in a series comprising the skulls of the gorilla, of *Pithecanthropus* and of modern man. There seems little doubt that the two series are comparable, except that in the hominid series we have to do with an absolute enlargement of the brain size and not with dwarfism and a relative increase. The gorilla is not in the direct line of man's ancestry, but nevertheless gives us a reasonable approximation to man's anthropoid ancestors (*Dryopithecus*). However, Weidenreich invokes a theory of orthogenesis based upon an inherent growth trend in the brain to explain the absolute increase in size of the brain in his hominid and pre-hominid series. Huxley, Dobzhansky, Gaylord Simpson and others reject orthogenesis, but do not examine the matter further in any great detail.

I suggest that the most reasonable explanation is to postulate growth rate genes concerned with the progressive enlargement of the brain and the natural selection of those mutations of these genes which increase the rate and amount of growth of the brain and alter the times of development of its various parts. Further, these growth rate genes have probably acted not so much upon the brain as a whole as upon the various individual areas of the cerebral cortex. There is some evidence in support of such a concept. The studies of Elliot Smith, Filimonoff and others show that the area of the visual cortex varies in different individuals and may even vary racially, while Filimonoff's figures show that there is an even greater variability in the parastriate and peristriate areas, the areas which are believed to be concerned with the higher and more recently developed or conceptual aspects of vision.

Some variation in the rate genes concerned with different areas would offer a feasible explanation of what appears to be varying dominance of different areas in different individuals. Further, Le Gros Clark (1946) refers to the work of Professor Sarkisov, of the Moscow Brain Institute, who states that the relative maturation of cortical areas was actually under investigation in his institute just before the war and that the following facts had been established: (i) that in men and monkeys the visual and frontal areas of the cortex differentiate and expand earlier than they do in lower mammals; (ii) that in man the frontal area develops more precociously than the visual area.

Pursued logically, the concept of altering rate genes seems to offer a reasonable explanation of the phenomena referred to by Bolk as fetalization (De Beer, Weidenreich and Huxley). I have assumed the validity of the concept of rate genes as developed by Huxley, De Beer *et cetera*. Huxley maintains that the concept of rate genes is as important for biology as the concept of genic balance or the gene complex, and refers to a progressive mutational change in the speed of processes controlled by rate genes.

Another peculiar feature of man first clearly stated recently by Julian Huxley is the uniqueness of his evolutionary history. To use Huxley's words, "a brain capable of conceptual thought could not have been developed elsewhere than in a human body". Analysing this statement, Huxley points out that evolution may be seen as an enormous number of blind alleys, with only occasional paths of progress. Progress may be defined as increasing complexity of organization making for greater control over the environment, both internal and external, and also making for greater independence of changes in the environment. First of all, only a large multicellular animal could develop sufficient freedom from its environment and a large enough nervous system for conceptual thought. Again, many types of specialization barred further progress. A further necessary condition for progress was land life. Consider the three highest groups of animals, the molluscs, the arthropods and the vertebrates; the molluscs never seem to have developed very efficient land types, the arthropods were limited in size probably by their breathing mechanism or tracheæ, and the vertebrates alone developed limbs, lungs and protective skin, distance receptors and a large brain, and homiothermy and homeostasis, or a relatively homogeneous internal environment at a constant temperature. Finally, sheltered development is found at its best among mammals. These last-mentioned conditions are found only in mammals and birds, and of these two the birds were probably excluded from further progress by their extreme specialization in flight mechanisms.

Temperature regulation is a necessary basis for progress, since without it the rate of the bodily functions could never be stabilized, and without such stabilization higher mental processes could never become accurate, continuous and dependable. As was mentioned above, the mammals made further progress by adopting viviparity, with its concomitant, family life. A further necessity for progress was the intrauterine development of only one young at a time, to prevent intrauterine competition and a consequent premium on speed of development. This monotocous condition, as it is called, permitted a slowing down of the rate of intrauterine development, which probably extended gradually into the post-natal period and led to the extremely prolonged period of post-natal development found in man—an almost unique feature. The prematurity period in man comprises nearly a quarter of the normal span of his life, compared with one-eighth to one-twelfth in the case of some other mammals. A few weeks or even years would be quite inadequate to acquire the mental and bodily skills which man now requires to absorb as a result of his social heritage.

Another product of the alteration of time of action of genes which expressed itself in what has been called "fœtalization" is man's relative nakedness. This, Huxley maintains, has been a spur to the improvement of intelligence, in terms of defence against the elements and natural enemies. Again, gregariousness was necessary, in order that speech might develop. A further necessity for the progressive evolution of the brain was arboreal life. As Elliot Smith (1912) first so clearly pointed out, only in an arboreal mammal could the forelimb become a true hand, leading to an elaboration of the sensorimotor area in the brain; at the same time the forebrain was partly freed from the dominance of smell, and the areas for sight and hearing could develop. *Pari passu* with the handling of objects by a true hand, binocular stereoscopic vision gave a more and more accurate picture of the outside world and provided the germs of concentration and attention. Thus tree life laid the foundation for the fuller definition of objects by conceptual thought, and at a later stage for their fuller control by tools and machines.

But for the ultimate step man's ancestors had to descend from the trees and to free the hand, and as Weidenreich suggests, the actual physical assumption of the erect posture and the balancing of a rounded skull on the top of the curved but erect spine possibly facilitated and was correlated with the enlargement of the brain and brain case. As to the exact stage in primate evolution when this last development took place, there is now some doubt.

It was usually assumed (Gregory) that it took place at an anthropoid level. However, recent studies of Wood Jones and Le Gros Clark (1939), though differing in detail, suggest that the divergence may have been somewhat earlier, though the actual stages have not yet been found. To quote Le Gros Clark: "If we accept the palaeontological evidence that irreversibility is at least a general feature of evolutionary development, we may quite legitimately infer from comparative anatomical studies that it is extremely improbable that man was derived from an ancestral stock in which the limbs become highly specialized for arboreal life. We may go further and suggest the probability that man diverged from the anthropoid ape stock at a time when the common ancestors were relatively small and agile animals, that is before the weight of a heavy body adapted for brachiation in the trees might have led to secondary distortions of the foot skeleton." It is interesting to note here the gradual descent of the centre of gravity in Primates, till in man (American whites), to quote Cotton, it lies "within 0.5% of the body height of a plane which exceeds the mean level of the anterior superior iliac spine by one-third of the distance of this level from the mean cristall height". At the same time the great sacrospinalis muscle, which helps to maintain the erect posture, reaches its lowest level in man—namely, down to man's centre of gravity (Gregory, 1928).

The final product was man with a relatively enlarged brain and brain case, balanced on a vertical though curved backbone, with his hands free and his foot and hind limbs specialized for walking. Just as Wood Jones and Le Gros Clark have suggested that the time when various of the above characteristics were acquired may be open to debate, so I would suggest that the actual evidence is rather in favour of the following sequence; first came the anthropoid stage, with a somewhat rounded (or mesocephalic) brain (but not brain case); then came the early hominid brain, which was often dolichocephalic, the enlarging brain and brain case developing first of all in an antero-posterior direction as its condyles balanced on the atlas; and then finally two types developed, one round-headed or brachycephalic and one more long-headed or mesocephalic, but both equally well endowed from the point of view of brain capacity. However, further knowledge of the genes and environmental factors concerned in head, skull, and brain development is necessary to settle these problems.

Reviewing the unique features of man's evolutionary history, we see that man alone among the Primates and mammals evolved all the prerequisites for the development of true speech and the acquisition of conceptual thought.

Turning now to the bearing of all these concepts upon the data of physical anthropology, I believe that while we may have to retain many of the measurements and observations both of living man and of skeletal material, whether of modern or fossil man, nevertheless the future of physical anthropology lies rather in genetic studies and in determining the genes and their interaction in development and in mapping the chromosomes by their linkage relations (Haldane, 1940). As Le Gros Clark (1939) has so strongly emphasized, this can be done only by field work upon living man—that is, by studies upon ourselves and not merely upon primitive races. The need for the above-mentioned genetic studies seems clear from Dobzhansky's dictum that "morphological" species and races are clear inferences from "genetic" species and races. It cannot be too strongly emphasized that this mapping of the genes and their interactions with one another and further measurement of environmental effects upon them can be done only by field work, by studies of living persons and their pedigrees or "family anthropology", and by studies of twins *et cetera* (compare also Ashley-Montague). The statistical methods necessary have been elaborated by Karl Pearson, Fisher, Haldane *et cetera*, particularly in the last decade (Haldane, Ford). Haldane has even presented a tentative locus map of the sex chromosome in man. How far we have to go may be judged by the fact that we either know or suspect the existence of some hundreds of well-defined genes in man, while the total number may well prove to be of the order



of 50,000 or more. But as Morant (1944) has emphasized, unless we subsidize physical anthropologists as such to carry out this vital work, it will not be done. Here in Australia we know very little of our own growth, of our fertility and the factors affecting it, or of our variability. Studies of the effects of climate and various diets are only just commencing. A school of physical anthropology is a fundamental need, and such studies should not be the spare-time interests of scientists in other fields, as at present. Such a school could well be formed in the proposed new university at Canberra.

Let us now revert to certain other unique features of man which are of special interest. One of these is that man is continuously sexed whereas most higher animals are discontinuously sexed. The significance of this, as Huxley remarks, is not clear; but he suggests that it may be associated with a gradual development of freedom from rigidly determined physiological mechanisms and instincts such as we see in lower animals, this freedom being due to higher (cortical) brain activity. My colleague, Professor C. Witherington Stump, suggests that a hormonal factor may also be involved.

Another unique character is man's reproductive variability. In man the range of positive fertility is enormous—from one to over a dozen and even more—and in contrast to this the number of infertile adults is considerable. This fact, besides providing great diversity in the patterns of family life, means that in the human species differential fertility is more important as a basis for selection than is differential mortality, and it renders possible a much more rapid selective change than is found in wild animal species. These changes, however, may not necessarily be progressive (Pearl, Pomerat, Carr Saunders, *et cetera*).

Next we come to one of the most remarkable features of man—namely, the length and relative importance of what Huxley calls his post-maturity. Huxley first of all defines it and points out that in the female a period of reproductive maturity is sharply defined from a non-reproductive post-maturity. In animals few survive long after the reproductive period, and certainly never for a period which may be equal to or greater than the reproductive period. In the male, Huxley takes the appearance of signs of age as a criterion of commencing post-maturity, rather than absolute loss of sexual capacity. Defining post-maturity in these terms, he states that in civilized man the average expectation of life includes over ten post-mature years, and about one-sixth of the population enjoys a longer post-maturity than maturity. To quote Huxley: "Further, in all advanced human societies, a large proportion of the leaders of the community are always post-mature". Writing in 1940, he stated that "all the members of the British War Cabinet are in their post-maturity". This is a remarkable phenomenon, and through it man utilizes a long period of life which in nearly all other animals scarcely exists. Its bearing upon the problems of social anthropology is becoming steadily more important.

Turning to further unique features of man especially associated with the development of brain and mind, and comparing these in man and in lower animals, we may say that the human mind has become relatively free both on the receiving and on the outgoing side. Man's capacity for acquiring knowledge has been largely released from arbitrary symbolism and his capacity for action from arbitrary canalizations of instinct.

But as a consequence man is one of the few animals in whom psychological conflict and the associated psychological mechanisms of suppression and repression occur. An animal is a creature of the moment, dominated in turn by one instinct or another, whereas man has attained a relatively unified mental life, except in such abnormal conditions as schizophrenia and split personality. Complete unity is, of course, found only in the best of us and, as Huxley puts it, "man is on the way to achieving permanent unity of command, but the captain has a disconcerting way of dissolving into a wrangling committee".

How slow this process has been and how arbitrary symbolism dominated early man and still dominates primitive

man has been told by the social anthropologist (Elliot Smith, Ruth Benedict, Bateson *et cetera*) and for modern man at this present day we may well quote Elliot Smith: "When man began to devise Civilization, he became entangled in the shackles of the theory of the State, which he himself had forged. It remained for the Greeks to remove the shackles and restore to human reason the freedom it had lost."

Examining other unique mental features of man, we find that these vary from such things as pure mathematics, religion and philosophy, the appreciation and creation of music, pictorial art, sculpture and architecture, literature and poetry *et cetera*, to the various social attributes, such as conversation, laughter, organized games and sport, education, the theatre, agriculture and gardening, while again there are the peculiar mental attributes, such as conscience, duty, sin, vice, humiliation, penitence *et cetera*; even those fundamental attributes which man shares with other animals, such as eating, sleeping and mating, have been greatly elaborated and surrounded with all sorts of unique and varied peculiarities, such as romantic love *et cetera*. Whether man possesses other as yet ill-defined powers, such as telepathy or extra-sensory perception, is not certain, though scientific evidence is accumulating in support of their existence. Just as the development of mind and conceptual thought in the last million years or so of earth's history has resulted in tremendous advances, so some observers have suggested that other great steps may lie ahead of us (Hearst). However, the clearer the picture of ourselves in the past and present becomes, the more confidence we can have in attempting to influence man's future progress, both materially in his surroundings and his control of them, and also in his own bodily and mental development and evolution.

It is not my province to discuss the philosophical implications of the picture I have briefly sketched. It is clear, however, that the social anthropologist and ultimately the statesman, must take into account and thoroughly understand man's mental variability and decide whether our aim should be to increase it by education and eugenics. Its bearing upon man's government is obvious and manifold in its possibilities. As Ogden, Everett, Huxley and others have put it, we must dare to be wise, we must not be afraid of our uniqueness; the way to wisdom lies through knowledge of ourselves both physically and mentally. To quote Le Gros Clark (1939): "The science of physical anthropology has contributed much to the past history of species. By the study of modern populations it has a still more important function to fulfil, the accumulation of data on the basis of which it will be possible in some measure to control the destiny of mankind in the future."

#### Conclusion.

In conclusion, many of the attributes of man upon which I have touched may seem trite; nevertheless we owe a debt to Huxley especially for having been the first to collect these facts together and put them in new perspective. Many of them need reexamination and further study. Most of them are related to the enlargement and development of man's brain, and I hope you will bear with me if I, as a neurologist, quote Sherrington's words on what may well prove to be the final problem for man—namely, the relation between brain and mind, though I shall omit his final pessimistic note, concerning man's doom. Sherrington (1933), discussing this problem, used these words: "Some of us—perhaps because we are too old—or is it, too young—think there may be arrival at last. And when, and if, that arrival comes, there may be still regret that the pursuit is over. If only for this, that man, the best among us, having found how the brain does its thinking, will certainly try to improve its ways of doing so, restraining some parts, amplifying others, introducing short cuts, and certainly increasing speed and aiming at economy and devising as seems to him best."

#### Bibliography.

A. A. Abbie: "Physical Anthropology—A Biological Science", *The Australian Journal of Science*, Volume VIII, Numbers 2 and 3, 1945.



- M. F. Ashley-Montagu: "An Introduction to Physical Anthropology", 1945.
- W. E. Le Gros Clark: "The Scope and Limitations of Physical Anthropology", Presidential Address, Section II, British Association for the Advancement of Science, 1939; "Paleontological Evidence Bearing on Human Evolution", *Biological Reviews*, Volume XV, 1940; "Deformation Patterns in the Cerebral Cortex", in "Essays on Growth and Form", 1946.
- C. S. Coon: "The Races of Europe", 1939.
- F. S. Cotton: "The Centre of Gravity in Man", *American Journal of Physical Anthropology*, Volume XVIII, Number 3, 1934.
- R. A. Dart: "Recent Discoveries Bearing on Human History in Southern Africa", *Journal of the Royal Anthropological Institute*, Volume LXX, 1940-1942.
- E. R. de Beer: "Embryos and Ancestors", 1940.
- T. Dobzhansky: "On Species and Races of Living and Fossil Man", *American Journal of Physical Anthropology*, New Series, Volume II, Number 3, 1944.
- G. Elliot Smith: "Studies in the Morphology of the Human Brain, etc. Number 1. The Occipital Region", "Records of the Egyptian Government School of Medicine", Volume II, 1904; Presidential Address to the Anthropological Section, British Association for the Advancement of Science, Dundee, 1912; "The Variations in the Folding of the Visual Cortex in Man", *Mott Memorial Volume*, 1929; "Human History", 1930.
- I. N. Filimonoff: "Über die Variabilität der Grosshirnrindenstruktur. *Regio occipitalis beim erwachsenen Menschen*", *Journal für Psychologie und Neurologie*, Volume XLIV, 1932.
- E. B. Ford: "Genetics for Medical Students", 1942.
- R. Ruggles Gates: "Phylogeny and Classification of Hominids and Anthropoids", *American Journal of Physical Anthropology*, New Series, Volume II, Number 3, 1944.
- W. K. Gregory: "How Near is the Relationship of Man to the Chimpanzee-Gorilla Stock?", *Quarterly Review of Biology*, Volume II, Number 4, 1927; "The Upright Posture of Man: A Review of its Origin and Evolution", *Proceedings of the American Philosophical Society*, Volume LXVII, 1928; "The Origin of Man from a Brachiating Anthropoid Stock", *Science*, Volume LXXI, Number 1852, 1930.
- J. B. S. Haldane: "New Paths in Genetics", 1941.
- J. H. Huxley: "Problems of Relative Growth", 1932; "The Uniqueness of Man", 1941; "Evolution, the Modern Synthesis", 1942.
- G. M. Morant: "The Races of Central Europe", 1939; "The Future of Physical Anthropology", *Man*, Volume XLIV, 1944.
- R. Pearl: "Introduction to Medical Biometry and Statistics", 1940.
- G. R. Pomeroy: "Fertility in Relation to Age at Time of Marriage", *Human Biology*, Volume VIII, 1936.
- C. Sherrington: "The Brain and its Mechanism", 1933.
- G. G. Simpson: "Tempo and Mode in Evolution", 1944.
- F. Weidenreich: "Six Lectures on *Sinanthropus Pekinensis* and Related Problems", *Bulletin of the Geological Society of China*, Volume XIX, Number 1, 1939; "The Skull of *Sinanthropus Pekinensis*", *Palaontologica Sinica*, New Series 10, Whole Series 127, 1943; "The Brachycephalisation of Recent Mankind", *Southeastern Journal of Anthropology*, Volume I, Number 1, 1945; "The Kellor Skull: A Wadjak Type from Southeast Australia", *American Journal of Physical Anthropology*, New Series, Volume III, 1945; "Giant Early Man from Java and South China", *American Museum of Natural History*, New York, Anthropological Papers, Volume XL, Part I, 1945.
- F. Wood Jones: "Arboreal Man", 1918; "Man's Place Among the Mammals", 1929.
- J. Wunderly: "The Kellor Skull". Memoranda of the National Museum, Melbourne, Number 13, 1943.

### SOME RECENT CHANGES IN THE OUTLOOK FOR THE CHILD.<sup>1</sup>

By F. V. G. SCHOLES, C.M.G., M.D., F.R.A.C.P., D.P.H.,  
Medical Superintendent, Queen's Memorial Infectious  
Diseases Hospital, Fairfield, Victoria.

DURING the nineteenth century the population, wealth and production of the earth increased at a rate unheard of previously. Literature, music, science and the arts flourished, the average span of life grew longer, and in most countries the bulk of the population enjoyed the blessings of peace for long periods. Yet possibly never before had there been such unhappiness in the mass, such searching for improvement in living. The unhealthy and depressing conditions of labour in slum factories, houses and tenements, such as prevailed in the great industrial towns of Britain, Germany and America, have been regarded as the major cause of this discontent and revolt. Yet it is doubtful whether the pitiable plight of the inhabi-

tants of these cities was worse than that of their predecessors of the seventeenth and eighteenth centuries. Wider knowledge, which resulted from easier means of communication following the introduction of steam power, was responsible for general dissatisfaction with things as they were, with poverty, disease and premature death. Not all the striving for reform came from below. It is easy for a cynic to say that the industrialist and the landowner agreed to concessions in fear of their safety, or to emphasize their realization that a labourer or craftsman would do better work if he was healthier, happier and more prosperous. But a study of the history of health and industrial legislation during the nineteenth century, in Britain for example, forces one to realize the presence of a strong individual sense of duty and philanthropy. So came the virtual abolition of child labour, the *Education Act*, the *Housing Act*, the *Public Health Act* of 1875, and revolutionary changes in hospital accommodation for the sick and aged. Knowledge grew in the domains of chemistry, physics and biology, and as the century advanced science insisted that poverty, disease and misery be fought with every weapon available to the laboratory and the trained mind.

What was done did influence the health of the community, including that of the growing child. Yet until early in the present century there was no concerted attempt to legislate, to plan and to provide for the child in particular. It is a melancholy thought that the past thirty-five years, which witnessed the introduction and development of maternity and infant welfare schemes, of the teaching of mothercraft, of pure food and milk legislation, of immunization against diphtheria, of school medical and dental services, of improvements in housing and school architecture, of recognition of the importance of child psychology, of kindergarten and nursery schools—that these thirty-five years have included the first World War, famines involving whole nations, the terrible pandemic of influenza, civil wars, and finally the catastrophic upheaval which has left a great part of the world in ruins, with famine, misery and fear still present.

It is not only to repair the wastage of these calamities that our nation is directing, and must direct, our sympathy and our money to the care of the child. It is not that we are merely rallying to the cry "populate or perish", or that we foresee and fear the time when there will be more old people than young people, more to be fed and clothed than to work and provide. The conscience of the public had been awakened long before it realized the dangers of a declining birth rate and a lengthened span of life.

Steadily, as scientific workers have established new facts, legislation and other measures have been devised for the well-being of the child. When it was found that water and milk, two prime necessities, could also be the most dangerous, and that overcrowded, ill-ventilated and damp dwellings produced unhealthy children, an impetus was given to pure food, milk, water supply, sewerage and housing legislation.

In another direction scientific workers made it clear that the sources of infection in common communicable diseases of children lay in the individual child, and this led to the beginnings of a school medical service, an organized study of individual children. With this came fuller recognition of the importance of nutrition and personal hygiene. During recent years there has come a gradual awakening to other matters—the need for frequent overhaul of our educational system and proper recognition of a child as an individual psychological entity.

To all these activities one may add the inauguration and growth of children's hospitals, with their many departments, and of special hospitals, homes and institutions to deal with different classes of sick, destitute or neglected children. The hospital almoner and health visitor systems have eased many household difficulties, and we may now plan for the "follow-up" and after-care of children who need attention.

Having these matters in mind, I have thought to touch upon some relevant subjects. They deal with physical states and changes, and do not include mental, moral or psychological states, which are equally important.

<sup>1</sup> Presidential address to the Section of Medical Science and National Health at a meeting of the Australian and New Zealand Association for the Advancement of Science, Adelaide, August, 1946.

No one who has spent his working life caring for sick children can be ignorant of the great and continued fall in mortality among children of all ages during the past thirty or forty years. It is possible to estimate the number of lives gained by comparing the actual number of child deaths with the number that would have occurred had the death rate of 1910 remained constant, and then making allowance for any debit or credit alteration during the years of useful working life. By any estimate a great number of working lives have been saved. However, before one assumes that this is an actual gain in every respect, it is proper to ask whether it is certain that the lives saved have been an asset or a liability, having regard to the sum of human development and ultimate happiness. Is it a fact that Nature's method of weeding out the unfit in the neonatal period and infancy is really an advantage to the survivors and ultimately to human development? If it could be shown that the total of human misery, poverty and suffering had been increased by their invalidity and unfitness in later life, there would be a case to answer. Happily, there is no need to answer it. Pity and love for and of humanity are priceless assets to the community. Moreover, many great men and women have "won through" in spite of gross physical handicaps in childhood. In any case, we have saved innumerable healthier children who a generation ago would have been killed. Acute infective enterocolitis, whooping-cough, primary laryngeal diphtheria, malnutrition from improper feeding—these are diseases of the healthy.

Whatever the special work in which we may be engaged, our first reaction, when contemplating the great fall in child mortality within our own vision, is one of gratification, perhaps of complacency. We can all show imposing rows of figures compiled from our own experience. But of late years one question has been increasingly in my mind when considering the cases of children who have recovered from an illness. In many instances there is no particular occasion for worry. But I have thought that in many others death has been deferred simply because the pathological processes were not severe enough or extensive enough to provide a mode of death, and that the preexisting condition which will cause death in two or in twenty years has been augmented and reinforced by this illness, recovery from which has given such complacency. Recurrences of bronchopneumonia and of streptococcal pharyngitis, for example, constitute important and in some cases fearful hazards. The causes and modes of death and invalidity among young children need more careful analysis and study.

#### THE CAUSES OF INFANTILE DEATHS.

In this country more than half of the children who die before completing their first year do so in the first week of life (2,914 out of 5,344 in the year 1941). The causes of death are prematurity, birth injury, malformations and other abnormalities of prenatal and neonatal life. For many years past there has been little reduction in mortality from these causes, and it is only by subtracting the number of these deaths from the total infantile deaths that one can really appreciate the enormous drop in mortality from other causes. If we make this subtraction we find that the principal immediate causes of death have been respiratory infections and enterocolitis. Whooping-cough exerts a notable influence on both of these according to its degree of prevalence in a particular year. Between 1911 and 1941 only a negligible reduction occurred in the mortality ascribed to pneumonia and bronchopneumonia. It is now apparent—but I wonder if we all have realized—that the progressive and excellent fall in infantile mortality during those years is mainly accounted for by the collapse of enterocolitis as a major cause of death.

It is a pity that there is no really accurate classification of deaths certified as due to diarrhoea and enteritis. Some babies have been weakly since birth, deficient in make-up and badly fed; the outlook for them in any case was doubtful, and for them the final infection was rather a mode than a cause of death. In many instances no gross infection at all has been present. In some the final attack of enteritis was precipitated by an antecedent attack of

bronchitis, whooping-cough or measles. Often the real cause of death was not the enteritis and not the whooping-cough, but a state or states already in existence.

The most obvious of these states is malnutrition. Good and bad nutrition are clinical states. Improper diet is often a cause; starvation is often an effect; yet these are not the only ones. Congenital syphilis is one preexisting condition which impairs or precludes proper digestion of cow's milk or milk mixtures. Certainly the decline in syphilis is one major factor in the decline in infant mortality. But other hereditary causes remain, and economics, environment, unfavourable seasonal conditions,

TABLE I.  
Deaths from Diarrhoea and Enteritis among Children Aged Under Two Years.

Period.	Average Annual Number.	Rate per Thousand Births.
1911 to 1915 ..	3,041	22.8
1921 to 1925 ..	1,973	14.9
1931 to 1935 ..	409	3.3
1936 to 1940 ..	371	3.0
1941 ..	173	1.5

prevalence of whooping-cough and many other factors play their part in the incidence and progress of malnutrition. Nevertheless, the great cause is preventable faulty feeding. Examples of overfeeding are to be seen in diets too rich in fats. The simplest example of underfeeding is the case of the child who has been on the breast too long, receiving poor quality milk. A third example is that of a child whose sole diet over a period has been an artificial malted food without milk. Such infants do not thrive, and slowly won gains are lost quickly by any trivial upset. This is the first stage of decline, and if it is prolonged they will drift farther. Many deaths recorded as being due to bronchitis and pneumonia occur among children already set on the downward road.

Much has been done to improve matters, notably in regard to attention to maternal diet during pregnancy and lactation, to education at mothercraft and baby health centres, to the encouragement of breast feeding, to instruction about weaning, to the provision of suitable artificial foods, to the control of syphilis, and to the provision of hospital clinics and accommodation.

#### Enterocolitis.

It must be reemphasized that the great decline in official infantile mortality rates is accounted for almost entirely by the decline in deaths due to enterocolitis. We cannot determine accurately the magnitude of that decline; but those of us who can remember and compare the summer months of, say, 1910 and 1946, can surely agree that it is in the neighbourhood of 90%. The principal reason can be put down in two words: safer milk. Much of our milk is pasteurized, much is bottled, some automatically; but a good deal is handled, transported and delivered in primitive fashion. Supervision and testing of dairy herds and inspection of farms and dairies can lessen the risk of tuberculous, typhoid and other alimentary infections and of streptococcal pharyngitis; but under present conditions there are not sufficient safeguards. Very properly housewives have been taught that cow's milk is a dangerous food, and they do their best to provide cool and clean storage in the home; but this is difficult in many households. My own impression of the decline in infantile infective enteritis is that it has become steeper during the last decade and coincides with a steady increase in the practice of boiling or simmering milk. Instruction on this matter by family doctors, and particularly at baby health centres, has not only affected those mothers who attend, but has been diffused throughout the country. Until milk for city children is obtained, pasteurized, transported and delivered in a safe and wholesome condition, and until it is possible for it to be kept so in poor homes, the practice should be encouraged.

When infancy is left behind infective enteritis also is left behind as a major cause of death. From now on the principal apparent cause of mortality, severe illness and subsequent invalidity, is infection of the respiratory tract. True, many young babies die of respiratory infection; but after the first year of life serious difficulties associated with that period are over. From then on underfeeding and improper feeding can be cured. Difficulties of nutrition are matters of education and economics and should be capable of elimination both in toddlers and in primary school children.

There is nothing intrinsically wrong with white bread, sugary cakes and jam as energy producers, or with the Australian child's preference for them. A sensible suggestion (which is not new) is that, instead of a child's being allowed or encouraged to satisfy his appetite with such fare, and to have literally no room left for essential solids, the common order of dishes be reversed. If a child comes hungry to table and is given his essential foods first, we may safely leave it to him to take afterwards as much energy producer as he requires.

Problems arise in the high cost of many essential foods (though milk, eggs, oatmeal and cheese are often fairly cheap), in their tendency to be unpalatable and undesirable in appearance, in bad keeping qualities, in difficulties in delivery and storage, and in seasonal variations in supply. All such problems should be met. If it is necessary, producers should be subsidized so that good and palatable foods may be readily accessible at reasonable cost. Free distribution of milk to school children has been notably successful wherever introduced, and it is good to see that the practice is being extended to pre-school children in many places.

#### The Response to Infection.

Bad nutrition is surely a principal cause of the absence or relative failure of the proper response to infection, on which the prospects of future health depend so much. During his first year the child is called on to make his first acquaintance with bacteria and viruses. An only child is likely to escape the more important virus infections until he goes to school or mixes with others at the nursery, crèche or kindergarten; but in any case pathogenic bacteria will have been brought to him. We must assume that three factors determine largely what takes place on that momentous first acquaintance: (i) the dosage of the foreign material, (ii) its quality, presumably physical, which we call virulence, and (iii) that other assumed quality, also presumably physical, which we call natural resistance or natural immunity.

In any case the quality of the first stimulus, the spacing and quality of successive stimuli, and the capacity of the body to respond, determine whether by the third or fourth year of life either gross damage has been done or the child has taken satisfactory steps towards immunity. Streptococci, pneumococci and others constitute important antigens, and examples of important damage exist in lesions of the sinuses, the aural cavities, the lymphoid tissues of the pharynx and naso-pharynx, and the lungs. Chronic or intermittent sinusitis and tonsillitis, *otitis media*, bronchitis, incipient bronchiectasis, these serve such children badly if or when they contract measles, diphtheria or scarlet fever. But if stimuli to the receiving surfaces, especially the tonsils, have been moderate and adequately spaced, they will have been carrying out their function in the development of immunity.

#### Tuberculosis.

The mortality from tuberculosis in young children has fallen steadily during the past thirty-five years. In 1911, in Australia, deaths of children less than five years old numbered 238; in 1941 the deaths numbered 70. For children aged between five and ten years the corresponding numbers were 61 and 22. The survey by Fry of 1,400 Adelaide school children aged from three to sixteen years revealed the surprisingly low overall percentage of 8.6 of Mantoux reactors. For children aged from three to seven years the percentage was 4.1, and for those aged from ten to sixteen years it was 10.1. It will be interesting to see

how much and how rapidly these percentages can be lowered by greater attention to preventive measures.

It is believed that a high percentage of children are infected at a very early age. Among young babies badly infected the fatality rate is high; death results from meningitis or miliary tuberculosis, and usually within two months of infection. In some cases the initial caseous lesion does not heal properly and extensive gradual spread takes place. In the remainder any caseous lesion resolves or calcifies and good or partial immunization results. Except in the acute fatal cases, the signs and symptoms of primary tuberculosis in young children are usually obscure and subclinical, even when active foci persist. When a lesion has healed or become quiescent, the cells and tissues have become sensitized and will respond differently to the next stimulus. The progress of such "tuberculin-positive" children, whose state is disclosed by the Mantoux test, the patch test, or both, will be determined by the intensity and duration of subsequent exposure to infection. Generally the source of their original infection has been a member of the family with an "open" tuberculous lesion and heavily infected sputum. It seems reasonable that not only should a child with an early primary infection be removed from such an environment and given sanatorium treatment, but also that other child contacts who are "tuberculin-negative" should be removed from the danger. Furthermore, children are placed in a dangerous position if during the stage of immunization they contract measles, whooping-cough or pneumonia.

It is not possible to lay down any set rule as to what exactly should be done; but surely many such children could be boarded out or colonies could be established for them. Progress made in pre-war years has been checked by war and post-war conditions. The insufficient housing, gross overcrowding and difficult domestic conditions of today, along with depleted hospital accommodation and staff, make it likely that the number of cases of uncontrolled infective tuberculosis and the total mass of infection will increase temporarily. We should be prepared for this. It may not be possible at present to provide sanatoria or village settlements, but surely arrangements may be made for many individual children. Early diagnosis by radiography and tuberculin tests should be followed by prompt consideration of what should be done for the individual child affected.

#### Measles and Whooping-Cough.

An only child living in a good residential area is likely to escape measles and whooping-cough until he goes to primary school or kindergarten. Such postponement is less likely in industrial areas, and the picture theatre, the street and even the nursery school or infant welfare centre present obvious risks. Infection of a baby or toddler by an older brother or sister often brings tragic results. Postponement till after the toddler stage has been passed is greatly to be desired.

Nearly all young children who die during an attack of measles or whooping-cough die with bronchopneumonia, and most of them of bronchopneumonia. Results of treatment of these complications with the early sulphonamides were not impressive, but they improved dramatically when sulphapyridine came into general use. We at Fairfield in 1939 had the opportunity of treating several hundred children suffering from bronchopneumonia accompanying measles with most gratifying results. Sulphapyridine has been superseded by sulphadiazine and sulphamerazine, but there appears to be still a place for sulphathiazole. The modern products are more easily tolerated and administered and, provided care is taken to maintain fluid balance and alkali content, few or no ill effects are ever witnessed. The net result has been a notable saving of life, more rapid resolution of the lesion in nearly all cases, and a greatly shortened stay in hospital. Except in urgent cases or when the infecting organism is sulphonamide-resistant, penicillin is hardly necessary. With regard to whooping-cough, there are too many factors in it besides bronchopneumonia that contribute to the pitiable state to which so many young babies are reduced; but good results



have been obtained in the cases of otherwise healthy children suffering from frank bronchopneumonia, particularly by the use of penicillin. In both measles and whooping-cough it has been possible to abort early otitis, stomatitis, coccal laryngitis and pleural empyema by using either sulphonamides or penicillin. The duration of established otorrhœa has been shortened. The prophylactic administration of sulphonamides is a practical measure to be carried out in both measles and whooping-cough wards in selected cases, particularly when scarlet fever is prevalent.

Provision of hospital accommodation in selected and complicated cases of measles and whooping-cough has in my own experience saved the lives of hundreds of children. Hospital treatment of such children should be encouraged and extended, if necessary to the exclusion of many older children with diphtheria and scarlet fever who can be attended to at home. Whooping-cough presents a difficult problem at best; but I have no doubt about the wisdom of hospital treatment of measles in young children from poor or unsuitable homes.

Measles epidemics most commonly arise in the spring, when other infections of the upper part of the respiratory tract are frequent, and this emphasizes the desirability of postponing measles until the toddler stage is past. As with all artificial preventive measures, no set rule should be followed and each individual case should be considered. A year-old baby is placed in danger when his older brother comes home from school in the early stages of measles. It may be taken for granted that the baby has been infected. If there is no third child the baby should be completely protected. Protection will not be lasting, but it will avert the present danger. I think that it is wrong to attempt attenuation, even if the child is well and healthy. If there is no reasonable guarantee that repeated contact with other young children can be avoided, attenuation should be aimed at. There is nothing new in this, and during the last twenty years we at Fairfield in many cases have procured the desired attenuation or protection, as the case may be, by injection at the proper time of a proper amount of either pooled adults' serum or convalescent serum. Results could not be guaranteed; sometimes protection was attained when the object was attenuation; sometimes unmodified measles followed.

For a sample of pooled adult serum to approach in value a good sample of convalescent serum the pool must be very large; otherwise dosage is too much a matter of guesswork, as is the case with serum from any individual convalescent. But an important advance has been made recently. Cohn and his co-workers separated the serum proteins of plasma into the main components, two albumin fractions and three globulin fractions. The qualities or substances we call antibodies are contained in the  $\gamma$  globulin fraction. A  $\gamma$  globulin preparation now available has a considerably higher antibody content than good convalescent serum. It has other advantages; it is far more stable and easily stored, and dosage is simplified.

Through the kindness of Professor F. M. Burnet, a supply of  $\gamma$  globulin from the United States of America was made available locally in September, 1945. Unfortunately our 1945 measles epidemic was almost over; but between September and December 116 children (sibling domiciliary contacts) were treated, in most cases between the fifth and seventh days after exposure. Three children developed unmodified measles, 46 children developed mild measles, and in 67 no signs of measles appeared. No one without personal experience can really appreciate what is meant by mild measles in this connexion. The symptoms are far less and of far shorter duration than those of a mild cold. These results were better than we expect from the use of a good convalescent serum, and are considered very satisfactory.

This  $\gamma$  globulin should be of use in the prophylaxis of other virus diseases. Except in special instances, chicken-pox, mumps and rubella can be ignored. But it is easy to imagine certain cases of contacts with poliomyelitis and whooping-cough in which protection might well be attempted.

Antibodies are found in lymphocytes, and it is believed that lymphoid tissue is a principal site of their formation. One may speculate on the possibility for practical use of stimulating human or animal lymphoid tissue with selected antigens, and on the recovery of the antibodies produced.

Apparently  $\gamma$  globulin is of no use in the preeruptive stage of measles or in the preparalytic stage of poliomyelitis.

#### Diphtheria.

Let us pass on to diphtheria. We are apt to misunderstand the importance of this disease. Fatalities associated with it are tragic. Mortality is considerable and regrettable, and its reduction will be welcome. But if we put aside the fatalities, diphtheria is not an important disease like whooping-cough or streptococcal pharyngitis. Permanent ill effects are rare after recovery and the lives of survivors are not shortened. Unfortunately no great reduction in the fatality rate is in sight. Deaths nowadays are due mainly to acute primary laryngeal diphtheria in young children, to malignant or "missed" severe diphtheria in school children and young adults, or to neglected laryngo-tracheo-bronchial diphtheria of *mitis* type.

I think also that we accept too literally a sharp and definite correlation between severity of illness and bacteriological type. It is true that laryngo-tracheal infection is usually associated with *mitis* infection, and that toxicity is low. But *mitis* infection elsewhere can be severe or even malignant. The only severe epidemic in Melbourne since 1936 occurred in 1941, and that was a *mitis* and *intermedius* epidemic. Severe pharyngeal diphtheria of *mitis* type was common. Since it became possible to differentiate the types, all three have been present in this country at times. Malignancy and intractability are the qualities commonly ascribed to *gravis* and *intermedius* types. Yet in epidemics in which one of these is predominant, large numbers of children are affected mildly.

Australian States, and particularly Victoria, were heavily "salted" with diphtheria for a quarter of a century, till the sudden and dramatic fall occurred in 1937. Through all those years the proportion of mild and moderate infections was higher than in Europe. But malignant diphtheria in the individual patient was and is just as severe as any diphtheria overseas.

#### Immunization.

There was a tendency to ascribe the dramatic fall in incidence of diphtheria in 1937 to the increase in the practice of artificial immunization. In 1938 I stated that I could not accept this view. The proportion of immunized children was not great enough; the fall was too rapid. What complacency we had was shattered by the epidemic of 1941. Fortunately its very severity frightened the community; diagnosis and treatment were established early, and a useful fillip was given to municipal organization for systematic immunization.

The steady increase in immunization in a steadily increasing number of municipalities is taking effect. One has only to contrast the incidence in areas where it is neglected with that in areas in which it is carried out systematically. One municipality in Melbourne has taken no active steps for many years and furnishes many more cases of diphtheria than its neighbours. In another, action for years had been confined to pre-school children, and practically to infants. In 1945 a sharp outbreak (of *mitis* type, by the way) of high fatality among school children served as a reminder that in a community where diphtheria has declined, but is not absent, immunization in infancy is not enough. In general, the course of immunization should begin at ten months, and at the time a child enters school either he should be retested and reimmunized if necessary or a single dose of anatoxin or "APT" should be given. This may be a counsel of perfection, and there is a temptation to accept for babies a rule-of-thumb method of two or three injections and to regard the really gratifying results as final—that is, to accept the idea that such children are equipped to meet all subsequent ordinary stimuli and thus to maintain their immunity. But this is not enough for a family practitioner, to whom the care of an individual child has been entrusted. It is his duty to

immunize him and not merely to inoculate him, and later on to make sure once more that he is immune through the dangerous school years.

The same serious consideration should be given to the immunization of a child against whooping-cough. To make an easy and attractive routine, combined prophylaxis against diphtheria and whooping-cough on a large scale has been advised and carried out in various communities. I have no objection to combined prophylaxis and have frequently advised it. But if it is begun at the age of ten months it will be too late for many. More than half of the deaths from whooping-cough are among babies less than a year old, and in many cases only a few weeks or months old.

A compromise has been suggested, just to make things easy. This is to begin the course of combined prophylactic injections at six or seven months.

Now we have no right to reduce knowingly the efficacy of measures we are taking against diphtheria in return for a doubtful benefit. Each case should be taken on its merits, and no other course is honest. An only child with no contact with other children may be left quite safely until the tenth month, if combined immunization is desired. On the other hand, in the face of imminent danger from whooping-cough, I have not hesitated to advise attempts at immunization at the age of three months and postponement of diphtheria immunization until the proper time.

May I submit that justification for sweeping claims about immunization against whooping-cough is not yet established? It is not necessary to wait for conclusive proof of efficacy of a method before applying it, even on a large scale. Moreover, sufficient data have been brought forward to justify such application. But it is desirable that such large-scale experiments should be properly controlled and that results should be properly interpreted, so that merits and limitations may be known definitely. With regard to most of the work described up to date, I am not satisfied with either control or interpretation. For instance, clinicians know that it is not a fair assumption that at all times and in all circumstances a very high proportion of unvaccinated children will contract whooping-cough if exposed to infection. Nevertheless the practice of immunization is to be encouraged with regard to both individual babies and communities, and irrespective of the child's age if danger threatens.

#### Streptococcal Infection.

Finally, there is time to touch on only a few aspects of streptococcal infection. If the pneumonias are excluded, this is not a common cause of death in infancy. But from then on, both as a primary and as a complicating factor, it produces more damage than any other. It is dominant in destructive processes in the upper, middle and lower portions of the respiratory tract. Too often local recovery and repair are poor and incomplete, and local and general immunity is not lasting. Immunity is limited and in some respects almost type-specific. The appearance or reappearance of a fresh type in a small or large community is followed by a fresh crop of infections. Where previous gross damage has occurred to the pharynx, the nasal cavities and the adnexa, these fresh infections are apt to be severe and destructive. On repeated infection the tonsil ceases to be a useful immunizing organ and becomes a positive danger. Late and remote effects of primary and repeated stimuli are nephritis and rheumatism, the causes of much subsequent invalidity and shortening of life.

Scarlet fever is an important complication of streptococcal infection; but there is no reason for marking it off sharply from pharyngeal infection not thus complicated. Its importance lies in the fact that it increases the likelihood of the local and remote effects that have been mentioned and that its infectivity is greater and prolonged because of discharges from the nose, throat and ear. These discharges tend to be chronic and to be lit up by recurrent attacks of tonsillitis. Otherwise scarlet fever as such has no special importance. We can neutralize toxæmia by the prompt use of antitoxic serum. Excellent

results follow the treatment by sulphonamides and penicillin of otitis, especially early otitis, and of other local and general septic complications. I have no doubt whatever of the benefits in practically all cases of hospital treatment until the stage of acute illness is over.

I think our next step should be to extend such benefit to all patients who require it, suffering from streptococcal pharyngitis, and unless there are special reasons for isolation, to discharge from hospital all well and convalescent scarlet-fever patients at a much earlier date than has been customary. The date should be determined by clinical study of each individual patient. It will be found that many patients are ready for discharge from hospital in from ten to fourteen days. But there is one necessary condition to be attached to this proposal—that the patient be observed regularly by the family physician or a visiting hospital doctor until the third week of the illness is over. Otitis, of course, may occur at any time; but if nephritis or rheumatism is to develop, the onset will almost certainly come within this period. All patients in whom such troubles do arise may then be treated either in hospital or at home. But the great majority of children of school age will escape, and in retrospect it will be seen that in their particular cases prolonged stay in hospital was unnecessary.

#### Nephritis.

In the case of nephritis the time interval between the antigenic stimulus and the onset of renal symptoms (antigen-antibody reaction) is so well defined that only a short period of observation is necessary, and control is easy. Unless the reaction is violent, with gross glomerular and tubular damage, recovery is usually good and not unduly prolonged, though in some cases repair appears to be slow and minor hemorrhage persists for even six or eight weeks or longer. Relapses and recrudescences may occur, but not commonly. They are associated in my mind with unhealthy tonsils, and I regard tonsillectomy as the first thing to be considered in prophylaxis.

I rather think that there is a relation between the incidence of nephritis and the prevalence of one or more particular types of hæmolytic streptococcus. Apart from its age incidence (four to fourteen years) there is no other apparent factor, and I should be inclined to say that in this particular pathological process the seed is more important than the soil.

#### Rheumatism.

The same cannot be said of rheumatism, which collects its victims whatever type of streptococcus is abroad in the community. Some persons respond in an abnormal way to streptococcal infection, and it is their reaction which determines the appearance of rheumatism or nephritis. But whereas in nephritis one reaction is usually enough and is roughly comparable with an attack of simple serum sickness or of measles, in rheumatism the tendency is to recurrence, with shortened successive incubation periods and often with increased severity of attack.

The soil is more important than the seed and the rheumatic child is an important subject for study and research. We should be able to find out what differentiates him, in the pre-rheumatic state, from other children. We can recognize the existence of personal factors—heredity, cellular make-up, neuropsychological instability and others—and environmental factors—poverty, overcrowding, liability to infection and so on. What we need is knowledge that will enable us to correct his inability to respond to antigenic stimuli in a normal way. So far this knowledge is being acquired slowly and piecemeal.

Our attempts to minimize the antigen-antibody clash after the stimulus has occurred have not been satisfactory. On the appearance of follicular tonsillitis, or scarlet fever, we at Fairfield have administered antitoxic serum at once (and for a time many years ago on the fifteenth day after the primary attack); but the results have been inconclusive, as was the case with the old antibacterial serum. Likewise, we have no definite evidence that sulphonamides are of value. Promising results have been obtained from prolonged administration of salicylates, which are believed

to modify or prevent antigen-antibody precipitation; but this is difficult to carry out in practice.

We may recognize the rheumatic child on the occasion of his first frank attack, which has not necessarily been his first response to a stimulus. More often than not no gross damage is done on this occasion, and carditis is unusual. But recurrence is likely, and in the case of young children, aged four or five years, it is more likely than in the case of a first attack in older children. Moreover, in the case of younger children recurrence is likely after a shorter interval. If reinfection of the upper portion of the respiratory tract can be avoided, there will be no reappearance of rheumatism; but it is useless to give cheap advice to parents to achieve what is impossible under modern conditions.

So it is that today large numbers of rheumatic children are, and have been for years, receiving prophylactically daily doses of sulphonamides in anticipation of streptococcal infection. The object is to suppress the multiplication of bacteria before they can produce a stimulus strong enough to precipitate a rheumatic attack in due course. The evidence to date indicates that the procedure is reasonably practicable, safe and efficacious, provided that the usual safeguards are observed. Continuous medication is not an ideal method of treatment; but if the lighting up of rheumatism can be avoided it will be well worth it.

#### CONCLUSION.

In conclusion, I think we may feel a certain pride in the many advances that have been made during the past few decades. Present-day psychological effects on parents and children are disquieting; difficulties of housing, nutrition and education are unpleasant to contemplate; the terrible toll of death and injury from road accidents is a matter for anger and anxiety. But we may be reasonably happy about many of the subjects discussed here today, and look with hope to the future.

### THE MODERN TREATMENT OF PULMONARY TUBERCULOSIS.<sup>1</sup>

By C. H. FITTS,  
Melbourne.

In the eighteenth century Dr. John Hill wrote a cookery book under the *nom de plume* of Mrs. Glassee. He began his recipe for jugged hare with the advice: "First catch your hare." At first sight this was a smug and unimaginative witticism and irritatingly obvious. Perhaps there was more to it than met the eye.

Before describing my recipe for pulmonary tuberculosis I too shall first try to catch my hare. Without knowing something of its gait and vagaries, one cannot maintain a critical attitude and retain one's judgement of the value of treatment in pulmonary tuberculosis.

#### Koch Phenomenon.

I shall begin my pursuit of understanding by referring to the Koch phenomenon. I remember learning about this interesting historical relic as a student, without ever realizing how much it explains. You remember that Koch injected a healthy guinea-pig with a pure culture of tubercle bacilli. This resulted in a local inflammation at the site of inoculation and enlargement of the regional lymph glands. After an interval of four to six weeks the animal was reinoculated, necrosis took place at the site of the inoculation, but the related glands did not enlarge and general infection did not ensue. The bacilli tend to become fixed at the site of local necrosis, which heals rapidly. It is no mere picturesque description to point out that, in gazing at this necrosis, Koch viewed the sacrifice of the local tissue to rid the host of the reinfecting bacilli. One may generalize, therefore, and say that it is part

of the Koch phenomenon that, on reinfection, the local organ sacrifices itself so that the body may be protected from bacillary invasion and live. The truth of this is nowhere better shown than in the lung. I shall show some films of primary infection in the lungs with the lesion at the site of inoculation and enlargement of the related glands. I shall show many of the reinfection type, in which there is destruction in the lung and no gland enlargement and no systemic disease.

People are fond of reiterating that pulmonary tuberculosis is but part of a systemic disease. This is an unhelpful and indeed a wrong conception. The whole meaning of the struggle that goes on in the lung is but a counterpart of the phenomenon observed by Koch in the skin of the guinea-pig. Even the cavity is seen in this light as a desperate effort to rid the lung of infection. Surely on reflection it is staggering how even the grossest destruction of lung tissue may occur without dissemination of the infection, other than by direct spread to the larynx and the gastro-intestinal tract. On the basis of the Koch phenomenon some of the modern treatment of pulmonary tuberculosis finds its justification.

#### Exudative and Productive Disease.

Much confusion can arise over the use of the terms exudative and productive disease in reference to pulmonary tuberculosis. By exudation is meant a process in which cells of inflammation and constituents of plasma infiltrate, without replacing, normal tissue. The Mantoux reaction is an example of this, and we may think of exudative disease in the lung in the same way, but with two qualifications. Firstly, in the lung the reaction is incited by live tubercle bacilli which may outlive the acute exudation, and secondly, in the lung there is ample space and the exudation may vary from a very small area to one which is massive. By production is meant the formation of a new tissue consisting of various types of cells, supported by a definite fibrous tissue stroma. Like a benign tumour, it displaces normal tissue. One might extend the use of that recent piece of medical jargon and call it a space-occupying lesion. There is justification in thinking that we can distinguish with some accuracy the radiological appearances of exudative from those of productive disease. As it is vital to know what may be the natural history of these distinct processes, I shall describe them briefly.

An exudative lesion may vary from one very small to one very large area, or from many small to many large areas.

The lesion may: (i) Absorb completely. (ii) Absorb almost, but not quite, completely. (iii) Caseate. An area of caseation may (a) undergo fibrosis and become carnified; (b) liquefy and form a cavity which, on opening into a bronchus, discharges its contents; (c) dehydrate and calcify. (iv) Show reactivation. Reactivation may occur in any one of these lesions, except when complete resorption has occurred. Even encapsulated and calcified lesions may become active again.

It is safe to assume that any moderately large shadow of fairly recent date represents an exudative lesion.

Acute pneumonic tuberculous processes are exudative. They may be indistinguishable from lobar pneumonia and they undoubtedly represent the most serious objection to that nebulous diagnosis "atypical pneumonia".

The productive reaction is the specific granuloma or tubercle. Its fibrous reticulum, lacking in the exudative reaction, is an important factor in its life story.

The granuloma (i) may regress and leave small, almost unidentifiable, scars; (ii) may completely fibrose; (iii) may become encapsulated by its own fibrous tissue; (iv) commonly becomes imperfectly encapsulated, so that the central granulation tissue progresses and breaks through (thus healing and progression may go side by side); (v) may caseate as in the exudative lesion. The results of caseation are the same in both instances—liquefaction and cavity formation, or dehydration and calcification.

It is clear, therefore, that once pulmonary tuberculosis is discovered the issue lies not so much between pro-

<sup>1</sup> Read as a post-graduate lecture at Brisbane, June, 1946.



ductive and exudative disease as between healing and progression.

Inherent in the struggle is the ability completely to resolve an exudative lesion so that no trace can be found. As good a result can be achieved by the regression of a productive lesion so that small scars are left. We may say, therefore, that healing is possible and that without active intervention. Short of this both lesions may be arrested, but with the latent power to erupt years after they appear to be extinct. Again, both exudative and productive lesions may caseate and then dehydrate and calcify, or liquefy and cavitate.

#### Cavitation.

There is no doubt that when the stage of cavitation is reached a grave state of affairs exists. Most patients left to their own devices have perished within five years of this development; very few survive ten years.

Cavities may be divided into three types:

1. Those without established walls. These are just necrotic areas in a caseous pneumonia. They are but the visible radiological signs of an inward disgrace which is generally mortal. One can but stand by and watch. Sometimes after life has survived tenuously for a longer period than anticipated, miraculously the tide turns and collapse by artificial pneumothorax may be helpful.

2. Cavities with young fibrous walls which are quite commonly seen as a development of the early lesion of the young adult. What happens to them is largely dependent upon mechanical forces imposed by the condition of the draining bronchus. This is the only type of cavity which will heal without aid in a reasonable proportion of cases. It is also the most suitable type for artificial pneumothorax.

3. Cavities with old fibrotic walls. These may be later developments of the second type and occasionally represent late excavation by an encapsulated caseated lesion. This type of cavity is there to stay. It is a reservoir for tubercle bacilli and tuberculous sputum from which spread of infection takes place by the bronchial tubes; it is the source of recurrent hæmorrhage. Indeed it is reasonable to suspect that any person who has a long history of tuberculosis and of recurrent hæmoptysis has such a cavity. It is not always visible in an ordinary film. It may be disclosed by tomograms or may first be recognized at autopsy. A remarkable fact about such cavities is that we have found them in servicemen on the point of discharge, who protest that they are in good health and are free from symptoms. Despite this, the expectation of life is limited. Such cavities are not commonly obliterated by pneumothorax. They may be obliterated or rendered less menacing by thoracoplasty.

If we are to judge the efficiency of modern treatment, we must know how cavities heal. The size and the age are important features. The larger and the older they are, the less likely are they to heal at all.

They may heal: (a) by rapid obliteration following bronchial occlusion, leaving a very small scar; (b) by slow gradual shrinkage and final obliteration, usually leaving a sizeable scar; (c) by sterilization of the wall, which perhaps becomes epithelialized, but the cavity remains; (d) by blockage of the cavity, which becomes filled with caseo-necrotic material containing tubercle bacilli. This may become dehydrated and calcified and sterilized. It is just as likely to reopen and discharge its contents into the bronchus.

It is obvious that some cavities will heal, left to themselves. It is known to everyone that people may live a long time in tolerable health with thick-walled tuberculous cavities. The justification for collapse treatment of tuberculosis in which cavitation exists is that few people survive more than five years after the detection of the cavity.

So far I have been at pains to emphasize what is common knowledge—the natural history of adult phthisis with its tendencies to resolution; to caseation, with liquefaction and cavitation, or dehydration and calcification; to fibrosis, encapsulation complete and effective, or partial and ineffective. I must emphasize that the productive and the exudative disease may coexist in the one person. Whilst fibrosis

is exercising a beneficent influence in one lung, the patient may have to contend with an acute exudative infiltration in the other.

All these points have an important bearing on one's attitude towards treatment. There are still others.

An increasing number of young adults have never been exposed to tuberculosis. One becomes aware of this through the close observation kept upon the nursing staffs of hospitals. My experience is of the staffs of the Royal Melbourne, Children's, Women's and Austin Hospitals. Thus 65% of all nurses on arrival for training at the Austin Hospital are "tuberculin negative", and 80% of those under twenty-one. Owing to shortage of staff it is unhappily necessary to put these nurses to work in wards devoted to tuberculosis. During this period their Mantoux test is repeated and as soon as the result becomes positive the chest is examined by X rays. One is then able to see the results of a primary infection in a young adult.

The course of this infection is as unpredictable as is that of the disease discovered by routine X-ray examination of servicemen and civilians. The orthodox method by which a physician is accustomed to meet disease is through the patient deciding that he is ill. In the nurse and in the serviceman whose infection is discovered by routine radiography we are dealing with two groups of persons who are unaware that they are ill. All of the patients presenting with symptoms and signs began like the nurses with a primary infection. Most, but not necessarily all, passed through a symptomless stage in which only radiological signs were present. Neither the nurse nor the serviceman can be regarded as having a static infection when the disease is first diagnosed. In each lie the same potentialities for resolution and development, as in the common adult phthisis with symptoms. The correct understanding and treatment of these people may well be more important in the future than is the management of the type of adult phthisis, with symptoms, which we are called upon to treat today.

It is not sufficiently realized that tuberculosis is a disease which may have a very acute onset. Far more often than is recognized, the onset is as dramatic as in pneumonia, for which it is frequently mistaken. Though it may appear to subside, it has not resolved completely. Quite a long time afterwards the patient is discovered to have pulmonary tuberculosis, which is not even then correctly related to the antecedent illness.

At the other extreme, when considering treatment, I must stress the utter chronicity of pulmonary tuberculosis. The so-called minimal lesion is the foster-child of silence and slow time. It may spring to life, however, after lying dormant for ten years or more.

#### Minimal and Early Lesions.

Never confuse a minimal with an early lesion. A minimal lesion is measured in terms of size; an early lesion is measured in time. An early lesion may be massive. The test that a lesion is early is to have a clear X-ray skiagram prepared just before the infiltration is visible in a later film. To judge the age of a lesion from the duration of symptoms is hopelessly misleading. It is impossible to tell the age of a minimal lesion on one film. One can judge the activity of a minimal lesion (a) if X-ray changes take place in it, (b) if there are symptoms referable to pulmonary tuberculosis, (c) if the tubercle bacilli are present in sputum or culture from the gastric mucus.

There is one other truth which is worth remembering. It is that from the beginning until the fatal issue healing is going on in the lungs. It may be that while death comes from destruction in one lung the healing process is dominant in the other. Why should there not be a *spes phthisica* in the minds of the patient and the doctor if the tissues deny that the struggle nought availeth, the labour and the wounds are vain?

I shall not apologize for this preamble. It serves to show that there is some design behind the protean characteristics of the disease in the individual; that there are ways and means by which healing may be achieved or the march of the disease stayed, even cavities obliterated, by natural processes. Inscrutably, at other times, the

patient fails to withstand the onslaught, even with the aid of modern treatment.

If we hold fast to that which is true and of good report we shall guard against uncritical belief in our own pet theories, such as that of the doctor who told a patient with a tuberculous cavity that having a baby would do her good. We shall escape that self-righteous, healthy belief in horsensense so often allied to a lazy impatience with new ideas just as much as the dangerous statement once made by a surgeon that the modern treatment of tuberculosis is surgical from the outset.

#### Treatment—The Plan.

The plain truth is that as yet we have not the secret of the cure of tuberculosis. The secret of successful treatment of pulmonary tuberculosis is to plan from the moment the diagnosis is established, and with the X-ray films and the results of bacteriological tests and, if necessary, the result of the Mantoux test available. A definitive plan may not be possible, but no matter how desperate may be the plight, one should always ask oneself what is to be done if the disease follows this or that particular course. Admit the probability of death and no plan is necessary.

I am sorry I cannot produce the films, but I recall a soldier with bilateral pulmonary tuberculosis, laryngeal tuberculosis and an ischio-rectal abscess. He lay in Heidelberg Military Hospital for two years, at first at complete bed rest and in silence. Then a pneumothorax was induced on the left lung, which was the site of a recent exudative lesion which had developed as a bronchogenic spread from a cavity in the upper and middle zones of the right lung. As time went on, it became apparent that the tide was turning. He began to gain weight and his temperature range was lower. The laryngologist pronounced the larynx healed. The ischio-rectal abscess ceased to be a worry. The disease seemed to be stayed in the left lung. The time seemed ripe and a partial thoracoplasty was done in stages to close the walled cavity in the right lung. He withstood these operations without causing serious worry. The Heidelberg Hospital having served its purpose, he was translated to the better life of a sanatorium. He has gained three stone in weight and is out of bed each day for a bath.

Let no one think that this long and arduous partnership is the pinnacle of achievement. Nonetheless it is something in the sorry scheme of advanced tuberculosis and has untold influence in a colony of patients. The salvaging of such lives represents one of the major contributions of modern treatment.

#### Artificial Pneumothorax.

The only active form of treatment which seems to lie in my province is artificial pneumothorax. It is difficult to lay down hard and fast rules in regard to its use. Rafferty, whose excellent monograph on artificial pneumothorax I commend to you, suggests that there is general agreement on the following indications:

1. Progression despite sanatorium care.
2. The presence of cavity and positive sputum not promptly controlled by bed rest.
3. Extensive cavernous disease in which conservative care would be ineffective.
4. Predominantly exudative disease that does not regress after proper bed rest.

My criticism of the first two indications is that no mention is made of the time factor. How long is one to wait before deciding that adequate sanatorium care has failed? Again, whatever the effect of rest on positive sputum, in my experience cavities are rarely promptly controlled by bed rest. Indeed it would be salutary to write a paper on the ultimate evil of too rapid improvement under sanatorium care and of the prompt control of cavities. Control in any event begs the question, for unless the cavity is obliterated it is not controlled.

Extensive cavernous disease in which conservative care would be ineffective sounds a dangerous indication for a pneumothorax, and again no measure of the term extensive is given. The picture this raises in my mind suggests rather an indication for thoracoplasty. With the fourth indication I am in agreement.

With full realization of the difficulties, here are some of the reasons which actuate me in deciding upon the induction of pneumothorax.

First, I like to decide upon my opinion of the patient rather than to confine my attention to the appearances of the X-ray films. I regard the management of a pneumothorax as a partnership between myself and the patient which, saving accidents or complications, will not be dissolved under two years. This partnership is to my mind one of the most valuable, but least emphasized, advantages of a successful pneumothorax. The character and temperament of the patient are factors to take into account. A rebel may become an ally, a timid soul may stand foursquare when her lung is collapsed.

I am influenced by such general points as a bad family history, the association of diabetes and the prospect of continuing a pregnancy.

I debate always the question of induction of pneumothorax in every type of unilateral disease. When the disease is minimal I endeavour to decide whether it is early and active or old and inactive, in the way already indicated. As cultivation of the mucus from the fasting gastric contents is often necessary, it is customary to take a further film for comparison after an interval of six to eight weeks, by which time the bacteriological report is available. This waiting period is spent at rest in bed, unless there are available previous films which indicate that the minimal disease is of long standing. In such cases the individual is discharged, subject to recall should the culture prove positive.

If the disease is shown to be active, even though minimal, I believe that a pneumothorax should be induced. I do not know in what percentage of early infiltrations cavities form, but waiting for the formation of a cavity to justify induction of a pneumothorax savours of shutting the stable door after the horse has escaped. I repeat that I know of no method of treatment which allows of such effective control for such a prolonged period. It is a *sine qua non* that a fluoroscopic examination is made before each refill, that the refills are done with skill and care, and that if possible the patient is associated with the same doctor throughout treatment.

Some forms of early infiltration cannot be described as minimal. I refer to a soft woolly infiltration occupying part of the upper and middle zones. This is probably exudative in character, but not associated with great constitutional disturbance. I am disposed to recommend the induction of pneumothorax in such cases, even though the bacteriological proof of activity is lacking.

There is a particular type of exudative disease in the middle or lower zones which begins quite acutely with high fever. It tends to settle down into a more chronic course, but it also tends to break down and to cavitate. One does not lightly recommend collapse in the acute stage, though my chief at Brompton Hospital, the late Dr. Batty Shaw, used to do so, sometimes with dramatic effect, sometimes, it must be admitted, with a resulting tuberculous empyema. After the acute stage and with the appearance of translucent areas in the opacity in the film, I believe pneumothorax may be very helpful. The presence of a soft-walled cavity or its appearance while a patient is under observation I regard as a strong indication for pneumothorax.

#### The Treatment of Bilateral Disease.

Even when the disease is bilateral I find myself considering in the plan the possibilities of pneumothorax and the necessity for thoracoplasty. It is necessary to ask oneself certain questions about the radiological appearances in bilateral disease. Is the amount of the disease fairly evenly distributed in both lungs and is it similar in character? One finds this in its fullest form in miliary tuberculosis.

It is highly probable, though difficult to prove, that a lesser degree of symmetrical involvement of quite an indolent nature is of haematogenous origin. If the distribution of the disease is unequal in the two lungs it is often possible to surmise that an area in which the ribs are huddled together, to which the trachea is drawn and

which perhaps contains a cavity, is the original site of the disease and that from this reservoir the soft, ill-defined exudative disease in the opposite lung has recently appeared through bronchogenic spread. The problem is difficult. First, the recent infection has to be controlled and for this a pneumothorax may be necessary. Secondly, the original site will require a thoracoplasty to render impotent the old cavitated area.

An hæmoptysis may require that we should decide from which lung the blood came, so that a pneumothorax may be induced.

In bilateral disease, after considering the patient as an individual, we must consider each lung on its merits and then, when deciding on the combination of treatment for both lungs, be mindful of the fact that it is necessary for the patient to continue breathing while he is being cured.

#### The Criteria of Active Disease.

The *raison d'être* for artificial pneumothorax is the presence of active disease and uncertainty about its future. The proofs of activity in order of precedence are:

1. The demonstration of tubercle bacilli in sputum or gastric mucus.
2. Certain radiological features *plus* the evidence of change in serial films.
3. Fever.
4. Symptoms and physical signs.
5. Biological proof. One sometimes is faced with the death of an infant from generalized tuberculosis from contact with a mother supposed to have arrested disease. It is to be emphasized that radiology may show the only evidence of activity, and decisions may have to be made on these grounds alone.

Once a pneumothorax has been initiated it is necessary by radiological control to decide its efficiency. It is said that the presence of adhesions means that the pneumothorax is unsatisfactory and calls for their division. I agree that this is so. It is further contended that if the adhesions are indivisible, the pneumothorax should be abandoned because its continuation is ineffective and there is a grave risk of rupturing an adhesion with the formation of a tuberculous empyema.

In my experience of partially successful pneumothorax I do not think the percentage of empyemata is high. Indeed, if I measure them against those which occur as a result of division of adhesions I do not think there would be much difference. That is not to decry the necessity for internal pneumolysis. Should this operation fail, then the reason for abandoning the pneumothorax should be that it is of no value, rather than that there is a small risk of empyema. Sometimes a pneumothorax is of distinct value despite persistent adhesions.

The important points in pneumothorax treatment are the amount of air to introduce at each refill and the spacing of the refills. Once the pneumothorax is properly established, the interval between refills should remain fairly constant. The amount of air introduced should very rarely be greater than 700 millilitres and generally less. If more than this is required, then the interval between refills is too long.

The duration of the treatment should depend upon the state of the patient and of the lung before induction, on the progress of the patient during treatment and, if possible, on the failure to discover tubercle bacilli by investigation. At the appointed time, rarely less than two years or more than five, the refills are abandoned, but the patient continues to present at the same intervals for screening. When the lung is almost expanded a film is taken, and on this can be based the decision whether to continue or finally to abandon the treatment.

#### Bed Rest.

I rather shrink from committing myself to the subject of modern methods of treatment. I am at one with the attitude of mind of the compilers of the hymn book. Let me therefore remind you that bed rest should still be

the most important single factor in the treatment of pulmonary tuberculosis. I do not believe that this can be as efficiently carried out by a lone patient in a hospital or at home as it can be in a sanatorium. Neither the induction of artificial pneumothorax nor any other form of treatment yet elaborated is a substitute for bed rest. If there is doubt about the desirability of inducing a pneumothorax, then the price that must be paid is a stricter and longer period of bed rest. There is more ultimate value in rest for a minimal active lesion than for established chronic disease. There is little doubt that circumstances and the modern attitude of mind combine to make the period of bed rest inadequate. At best it may achieve everything that can be done by the induction of artificial pneumothorax.

I should like to conclude with a personal experience. Some years ago I was working through the summer months at a sanatorium in England. There were, I remember, about seventy patients of both sexes. The work was hard going. I began my morning round at 7.30 o'clock, did a good deal of the treatment, dispensed the drugs, and did the laboratory work.

I remember particularly the evening round. This began at 5.30 o'clock and it was intended to be rather perfunctory. My senior colleagues had no difficulty in finishing this round by 7 o'clock, which meant less than one and a half minutes to each patient. Through lack of training in making a good exit, I never was able to achieve this feat; indeed I sometimes did not finish my evening round until 9.30 o'clock.

We had as a patient a psychiatrist, a rather silent person of large experience. One evening he said to me: "Would you like to know what we patients think of you doctors?" I replied that I would, so he asked me to come and sit down on the chair by the bedside. He then said that he thought there was something to be said for the old-fashioned family doctor who sat down beside the patient and felt his pulse. One felt, he said, that he was on one's side. "You doctors, you know, come in and stand at the foot of the bed and gaze down. One knows that you are wondering how quickly you can get out—not a very satisfactory atmosphere in which to encourage a patient to talk about his worries." He told me that under such conditions a patient in desperation will throw out some remark so apparently trivial or foolish as to seem unworthy of comment, and yet beneath it lies a world of meaning. This is profoundly true, as I have good cause to remember.

He pointed out to me that sometimes one of the doctors left the foot of the bed and would come and talk to him while standing on the left side of the bed. The psychiatrist had a left-sided pleural effusion, and this was his weak side.

He asked me what I noticed in his room, and pointed out that the room was naturally divided into two parts by the bed. I saw then that on the one side were the books and belongings of a thoughtful person, and on the other his fiancée's photograph and various amusing postcards and odds and ends sent from the Continent to cheer him through a fit of depression. He asked me if I observed when these things arrived and did I remember when his fiancée came over from Europe and had I deduced the things that he had not had the opportunity to discuss?

I left him that night profoundly humbled. It is not enough to put a patient in bed, you must give him too the hygiene of a quiet mind.

These things are ancient. They are as old perhaps as the Hippocratic corpus. They will outlive what old Dr. John Brown might have called the transcendental refinements of modern treatment. Modern treatment, collapse therapy, will have its day, but who can doubt that it will pass as the necessity for it passes? Our successors will ponder with amazement our ingenious onslaughts on the thoracic stronghold, for they will not realize with what we had to contend. I offer no apology for modern methods of treatment. What I aspired to do and did not comfort me.

#### Acknowledgements.

I wish to pay a tribute to Professor Max Pinner's "Pulmonary Tuberculosis in the Adult" and to the writings and personal communications of the late Dr. R. C. Wingfield. I have borrowed freely from all these sources.



A PORTABLE, SELF-CONTAINED APPARATUS FOR  
THE INDUCTION AND MAINTENANCE OF CON-  
TINUOUS INTRAVENOUS ANÆSTHESIA, WITH  
SOME OBSERVATIONS ON THE USE OF  
"PENTOTHAL SODIUM".

By RONALD V. PRATT,  
Perth, Western Australia.

THE APPARATUS.

DURING the past ten years intravenous anaesthesia has increased steadily in popularity.<sup>(1)</sup> Today it is regarded by most anaesthetists as a proven agent of great value in a vast surgical field. From its beginnings as a form of anaesthesia used rather hesitantly, with many restrictions, and solely for short operative procedures of not more than fifteen or twenty minutes' duration, it is now employed extensively, either alone or in combination with other agents, for prolonged surgical procedures in abdominal, genito-urinary, orthopaedic,<sup>(2)</sup> thoracic and many other fields, and with general satisfaction.

Advantages.

Undoubtedly a number of significant advantages are to be gained from the judicious use of intravenous anaesthetic methods.

From the anaesthetist's viewpoint, it would be difficult to imagine an easier or quicker method of inducing satisfactory anaesthesia than the intravenous use of the barbiturates (of which, incidentally, my own preference is for the popularly used "Pentothal Sodium"). To maintain an adequate plane of anaesthesia is likewise easy. And, from the patient's point of view, it is only necessary to recall the frequent requests for this form of anaesthesia made by those who have previously experienced it or who have heard of it from a friend, to realize how much it is appreciated as a comfortable, even pleasant, procedure.

With regard to its safety, it has been stated on good authority<sup>(3)</sup> that, when correctly induced and maintained, intravenous anaesthesia is as safe as any established method of anaesthesia. I cherish a personal impression that, when correctly employed, it is a good deal safer than many other methods, and very much more so when used in judicious combination with other agents.

The rapidity and quietness of induction, contrasting with the stage of excitement seen in other methods, are particularly appreciated when one is dealing with such unsuitable conditions as fractures, in which increasing tissue damage is a complication to be feared. As the agent is non-inflammable, it permits the unrestricted use of the electro-coagulating and cauterizing currents, and of other procedures contraindicated in the presence of inflammable and explosive anaesthetic agents.

Most patients are benefited by the almost constant absence of post-operative nausea and vomiting; this is of great value, particularly for patients suffering from herniæ and for subjects in body casts and others. Further, when a continuous drip method of administration is employed with the anaesthetic agent in saline solution, there is the great satisfaction of knowing that (unless these are contraindicated) the patient will automatically receive fluids intravenously during operation. By varying the rate of drip it is possible to give as much as a litre or more or less than 100 millilitres, while if blood is required, there is nothing further to be done except to connect the blood reservoir and a transfusion is in progress.

Limitations.

Factors determining the range of usefulness of intravenous anaesthesia may be summed up under the headings of (i) the patient, (ii) the anaesthetist, and (iii) the facilities available. The purpose of this report is concerned primarily with the last-mentioned consideration.

The Patient.

The condition of the patient, even more than the nature of the contemplated surgical procedure, must remain, firstly and lastly, the most important consideration in deciding whether "Pentothal" may or may not be used. A short discussion will be given later of certain contraindications to the method, of which the most salient are the presence of actual or potential respiratory embarrassment and the unsuitability of such anaesthesia for young children and for patients whose vitality is grossly impaired by shock or toxæmia.

The Anaesthetist.

Intravenous anaesthesia should not be considered unless it is to be induced, or at least supervised, by an anaesthetist who has gained some practical familiarity with the method and who is fully aware of, and able to deal effectively with, its possible hazards. However, and with this provision in mind, I do not see why intravenous anaesthesia should not, in this country at least, become an everyday procedure in the hands of the general practitioner. For the successful realization of this aim there are but two requirements to be fulfilled. Firstly, it must be accepted that the administration of "Pentothal" demands the exercise of a high degree of care. Technical details regarding indication for its employment, the method of use, post-operative care, and so on, are quickly mastered; but the importance of careful attention is often grasped only with increasing experience. Secondly, a simple and convenient method of using intravenous anaesthesia should be decided upon and made available for general use.

Facilities Available.

A new principle (or rather the recent acceptance of an old principle) such as anaesthesia by the intravenous administration of barbiturates, is of no great value until a way has been found for its practical use under many varying conditions of practice.

"Evipan Sodium", "Pentothal Sodium" and similarly acting drugs were first given simply with a "Record" syringe and needle. Needless to say, there were considerable disadvantages in this method, despite its extreme simplicity. The anaesthetist was compelled to hold the syringe continuously and with great care, injecting a little of the solution from time to time, until, as frequently happened, the needle became blocked with blood clot or was dislodged from the vein. There were other disadvantages, and these technical difficulties rendered the method useless, or at least uncertain, for operations of any length.

A simple modification of this original technique, which gives a considerably greater range of usefulness, was achieved by the introduction of a fine catheter or rubber tubing between the syringe and the needle. I have reported in detail a device of this nature in an earlier communication.<sup>(4)</sup> The syringe and the anaesthetist are removed from the site of the cubital fossa; they are given more freedom of movement, and the anaesthetist may if required pay almost constant attention to the patient's head. A spring clip on the catheter, or some equivalent device, serves successfully to prevent clotting in the needle, and between injections the syringe is "parked" in a clip-rack attached to a Cramer wire arm-splint. This has proved a most satisfactory and simple arrangement, permitting prolonged administration of "Pentothal" in many types of surgical procedure, and with a minimum of apparatus.

Another method is practised by setting up an apparatus for the intravenous drip infusion of saline solution and intermittently injecting "Pentothal" by piercing the rubber tubing with the needle of a syringe filled with "Pentothal" solution. While objections have been raised to several aspects of this method, I think that in the absence of special apparatus it is fairly simple and reasonable.

Other methods suggested have for the most part been more complicated without providing any real advantages. Several authors have described methods for supplying a continuous saline infusion fed by positive pressure in the

saline bottle.<sup>(7) (8) (9)</sup> I dislike having to rely on rubber bulbs such as are required in positive pressure apparatus, and I much prefer the simpler and equally effective gravity drip feed.

#### Description of the Apparatus.

In the apparatus to be described I have attempted to provide a relatively simple instrument for the administration of "Pentothal" anaesthesia in the presence of a continuous gravity drip saline infusion. The apparatus is portable and is ready for use at a moment's notice. It is simple and convenient to use, and except for a supply of oxygen (which it may be possible to incorporate shortly), it is entirely self-contained; all requirements incidental to the anaesthetist's purposes are carried in one large case.

Figure I illustrates diagrammatically the general principle of the apparatus. Normal saline or isotonic glucose solution passes via a drip tube into the vein of the patient. A graduated glass cylinder containing "Pentothal" solution hangs beside the flask; this reaches the main flow by fine rubber tubing at a point between the drip tube and the site of venipuncture. The entire system of glassware and tubing shown in this diagram (with the exception of the "Soluvac" flask and the tubing clips) is carried, already sterilized and partly assembled, in a small sterilizing drum which fits into the drawer of the wooden stand.

The component parts of the apparatus are shown in Figure II. Figure III demonstrates the size and portability of the carrying case, and Figure IV is a photograph of the apparatus in use. (Since the last-named photograph was taken it has been

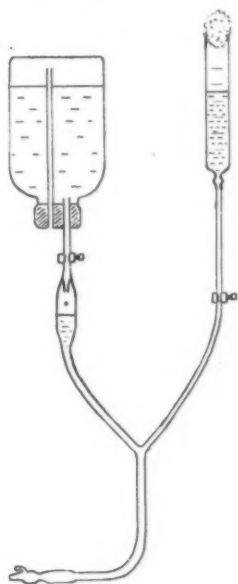


FIGURE I.

found more convenient to make a slight alteration to the apparatus whereby the drip-tube is thrust directly into the flask.)

#### Contents of the Drawer.

The drawer is divided into two compartments. Into the rear compartment is fitted the sterilizing drum. Its contents are sterile and are packed in a definite order to facilitate setting up; from above they comprise the following: (i) dissecting forceps; (ii) towels; (iii) the apparatus represented in Figure I (less the "Soluvac" flask); (iv) a medicine glass and a small jar of swabs; (v) a ten-millilitre syringe (for the preparation of "Pentothal" solution); (vi) a case containing a two-millilitre syringe, hypodermic needles, large-bore needles for the preparation of "Pentothal" solution, and a trocar and cannula that I have described elsewhere.<sup>(10)</sup> The front compartment holds a collection of non-sterile accessories and ampoules containing sterile drug solutions, as follows: (i) a box containing six ampoules (0.5 gramme) of "Pentothal Sodium", with ampoules of distilled water; (ii) ampoules containing sterile solutions of "Coramine", adrenaline, lobeline, strychnine, hyoscine, morphine with atropine, and morphine with atropine and hyoscine; (iii) a vial of "Neosynephrine Hydrochloride" (sterile solution); (iv) a vial of picrotoxin (sterile solution); (v) a bottle of antiseptic ("Monacrin", 1 in 1,000, in alcohol, 60% strength) for skin sterilization; (vi) gauze bandages and adhesive plaster; (vii) anaesthetic airway and a pair of scissors.

#### Method of Use.

Arriving at the operating theatre (or private house) with the apparatus packed in its case, one assembles it in a few moments. The stand is placed on a table of medium size, which should be at least as high as the operating table to ensure a good flow of saline solution. A detachable wooden back-support is supplied, but this is hardly necessary, as it would be difficult for the stand to be accidentally overturned. The patient's arm is fastened to the Cramer splint with gauze bandages from the drawer. It is advisable to anchor the wrist down to the anaesthetic table with a turn of the bandage. The "Soluvac" flask is taken out, its cap is stripped off, and it is placed beside the stand.

The sterilizing drum is now taken from its drawer and with the dissecting forceps (which should come first to hand), the top towel is lifted out and spread over the baseboard of the stand. The tubing, drip tube, glass

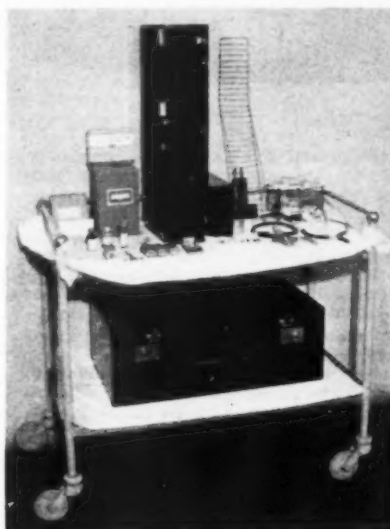


FIGURE II.

cylinder *et cetera* are then lifted out, care being taken to hold them in such a way that the free ends do not dangle and become unsterile. They will be found packed as three separate systems, in a thin swathing of gauze; these are easily joined together, and the whole is mounted by pushing the "Pentothal" cylinder and the Y-piece into their respective clips (the latter piece is snapped into the clip on the baseboard by invaginating it into the overlying sterile towel). Both screw clamps are tightened on their respective pieces of tubing, after which the "Soluvac" flask may be pierced with the drip-tube and suspended from its hook.

At this stage it will be convenient to make up a solution of "Pentothal Sodium", using the ten-millilitre syringe and one of the large-bore needles. As each syringe containing 0.5 gramme of "Pentothal" is made up, it is discharged into the graduated glass cylinder, after which the plug of sterile wool is replaced. If an operation of average duration is contemplated, it is as well to make up initially about 1.0 or 1.5 grammes (20 to 30 millilitres of solution, if 5% strength is used).

The clamp below the drip-tube is now opened to flood the tubing with saline solution, and adjusted to a rate of drip of about 40 to 60 drops per minute. While the saline solution is still dripping, the free end of the tubing is raised and the glass viewer is snapped into a small clip mounted beside the "Pentothal" chamber, in such a way that the terminal adapter is just clear of the non-sterile

stand, and at such a level that the drip is automatically stopped. The apparatus is now set up and ready for use.

After the skin has been swabbed with antiseptic solution (such as the spirituous solution of "Monacrin" provided for the purpose) and assistance has been obtained to compress the upper part of the arm if necessary, the special trocar and cannula<sup>(1)</sup> are thrust into the selected vein. Removal of the trocar instantly determines the accuracy of venipuncture by the appearance of blood.



FIGURE III.

When one is satisfied that the cannula is within the lumen of the vein the trocar is removed and the cannula is pushed up the vein to a more secure position. The free end of the tubing is now taken from its clip and locked into the cannula by the terminal adapter; the saline solution should now commence to drip again and the infusion is under way. After the skin has been dried with a sterile swab a strip of adhesive plaster across its side-arms will hold the cannula securely in place.

It only remains to unscrew the clamp regulating the "Pentothal" column, and the patient immediately receives as much of that solution (by gradual and intermittent administration) as is necessary to effect induction of

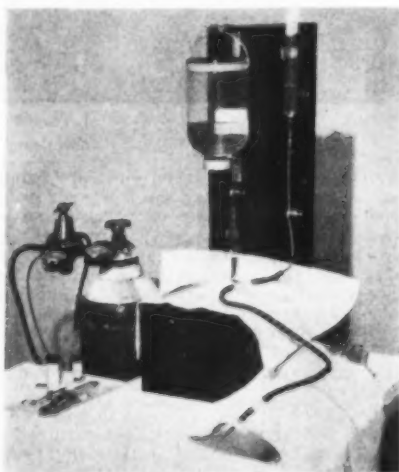


FIGURE IV.

anaesthesia. This clamp is then screwed up again. After the saline drip apparatus has been given a final adjustment there is usually nothing further to be done throughout the operation (unless an inhalational anaesthetic is being given as well) but to watch the patient, occasionally releasing the "Pentothal" screw to give one or two millilitres of solution as required.

At the conclusion of the operation, if it is desired to use the same method for the next case, it will be sufficient

to detach the tubing distal to the Y-connexion and to have this boiled together with the trocar and cannula.

When the round of surgery is finished, the original contents of the sterilizing drum are cleaned and replaced in their customary order in the drum (fresh towels being put in where necessary). The drum is then autoclaved and put back in its drawer. Deficiency, such as a "Soluvac" flask, bandages, "Pentothal" and distilled water ampoules *et cetera*, are replaced. The packed case is now again ready for instant use.

Although this procedure may sound at first rather complicated and time-consuming, in practice the apparatus is assembled and anaesthesia is induced in at most a few minutes only. The only cause for delay so far encountered was my own mortifying inability (on first using the apparatus) to pass the cannula into a vein. Needless to say, it is recommended that some familiarity with the apparatus and its assembling be achieved prior to its use for the first time.

#### Comment.

This compact apparatus provides a reliable, swift and satisfactory means for the induction and maintenance of intravenous anaesthesia as an everyday procedure. It is reliable, because (if carefully repacked after each period of use) it provides complete facilities for administering a general anaesthetic in almost any circumstances; one no longer needs to rely upon the operating theatre staff or others to produce suddenly a bandage, a syringe of "Coramine" or picrotoxin solution, an arm-splint, or some other article suddenly needed.

I should be glad to receive any suggestions for useful additions to the existing contents of this outfit. The carrying case, when packed, still has much space for additional anaesthetic gear, such as ether, masks, equipment for spinal or local anaesthesia, the "catheter" device for giving "Pentothal"<sup>(1)</sup> intermittently when a saline infusion is not wanted *et cetera*.

Anaesthetists wishing to have their apparatus always in readiness, even during the autoclaving of the drum, would find it convenient to possess a second sterilizing canister, packed in duplicate.

The portable "Pentothal"-saline solution infusion apparatus as described may be obtained, completely equipped, from Felton, Grimwade and Duerdins, Proprietary, Limited, of 21, Alfred Place, Melbourne.

#### SOME OBSERVATIONS ON THE USE OF "PENTOTHAL SODIUM".

In assessing the suitability of a patient for intravenous anaesthesia it is simpler first to consider whether definite contraindications exist or not. Intravenous anaesthesia should not be employed, in our present state of knowledge, for children aged under ten years; some reduce this arbitrary limit to seven or eight years, but this will obviously depend on the individual case, attention being paid to the physiological reasons of high oxygen requirements, narrow air passages, poor veins *et cetera*, which underly the prohibition. Nor should it be employed lightly for older subjects when some actual or potential obstruction to the airway exists. Barbiturates, it is said, heighten parasympathetic activity generally, and not only is an increased amount of saliva and mucus secreted, but there is a tendency towards spasm of (most significantly) the larynx and jaw. When this is considered with the inevitable occurrence of depressed respiration, it will be realized how all-important is this matter of an initially good airway, which is also free from such potential dangers as blood or pus in the pharynx, surrounding inflammation and so on. It is probable that patients suffering from bronchiectasis, severe grades of anaemia and degrees of cardiac failure manifesting dyspnoea should not be anaesthetized by intravenous means. Patients suffering severely from shock must be regarded with caution. If "Pentothal" is used, it is essential that shock be treated first and that it be realized that requirements of the drug in such cases are much less than those of robust patients. In fact, war surgery has shown that as little as one-quarter and even less of the usual doses has been found sufficient on occasions. Similar limitations hold in the case of



toxæmic and exsanguinated patients, and unless the necessity for greatly decreased dosage is realized and observed by painstakingly cautious initial administration, fatal overdosage must logically be anticipated.

Some contraindications must be observed rigidly at all times. There are occasions, however, when a certain elasticity of judgement is possible in trying to decide for the best in the patient's interests.

For example, the first subject in my previous practice on whom I used "Pentothal Sodium" for prolonged anaesthesia was a man who had been kicked in the face by a horse. He was a subject of chronic bronchitis, and was brought into the hospital in the small hours of the morning, after a journey of nearly 100 miles, with gross lacerations of the face, compound comminuted fractures of the body and ramus of the mandible, and a fair degree of shock. The presence of shock plus the threat to the airway from free hæmorrhage, bone fragments and a partly torn-off tongue rather discounted the use of "Pentothal"; and yet such other methods as were available, including intratracheal anaesthesia, did not seem possible in the presence of such extensive facial and oral damage. However, rightly or wrongly, "Pentothal" was employed, with most gratifying results from all aspects.

It may happen sometimes that manufacturers' packing information is somewhat out of date by the time the drug container is opened. I found a leaflet of this nature in the carton of a barbiturate for intravenous use which I recently received, and was interested to read the recommendation that the contents should be employed only for anaesthesia lasting from five to twenty minutes, and that one gramme of the drug was the maximum dose and was rarely to be employed. I have previously<sup>(6)</sup> reported the use of "Pentothal Sodium" as sole anaesthetic agent in an intra-abdominal operation lasting five hours, during which two grammes of "Pentothal" were used. Adams (1945) mentioned a case in which "Pentothal" anaesthesia lasted eight hours, 5.9 grammes being administered. There has also been reported<sup>(7)</sup> the anaesthetizing by "Pentothal" of a woman, aged twenty-seven years, on some 212 occasions over a period of twenty-six months; liver function tests are said to have continued to give satisfactory results.

#### Combinations of Drugs.

During the past two or three years combinations of "Pentothal" with other anaesthetic agents have become increasingly popular.

The administration of oxygen during "Pentothal" anaesthesia (by face-mask, catheter, intratracheal tube *et cetera*) has been found of great value in combating the tendency to anoxæmia from depressed respiration. It has been said that muscular relaxation is better, and that smaller doses of "Pentothal" are required.

A combination which I have found excellent is that of "Pentothal" with local or regional infiltration. The advantages are that the latter can be performed painlessly, abdominal relaxation is secured, a minimum of "Pentothal" is used, and if the local anaesthesia should wear off or prove inadequate, it is at once supplemented by further "Pentothal". A nervous patient, too, may sleep throughout his operation.

I have not used "Pentothal" combined with spinal anaesthesia, as I find that the premedicating effect of "Nembutal" with morphine, hyoscine and atropine is entirely satisfactory for most spinal anaesthetics. However, spinal anaesthesia with accompanying administration of "Pentothal" (with or without the further addition of nitrous oxide and oxygen) is becoming a popular combination in the hands of some anaesthetists, particularly in the United States of America.<sup>(8)</sup>

At the Mayo Clinic it has become a routine procedure now to combine the "Pentothal" anaesthesia with nitrous oxide and oxygen anaesthesia.<sup>(9)</sup>

The value of "Pentothal" as a means of induction in ether anaesthesia should be mentioned. Not only does it produce a pleasant and extremely rapid loss of consciousness for the patient, but for the anaesthetist it has the advantage of abolishing that drawn-out period of excitement often associated with such inductions. Working single-handed, I have at times carried out an easier and

more comfortable regional infiltration of the abdominal wall after a preliminary "single shot" injection of "Pentothal".

#### Pre-Operative Medication.

In an "average" case I usually give one and a half to three grains of "Pentobarbital Soluble" ("Nembutal") on the evening before operation. Not only does this produce an excellent sedative effect, but it is, I believe, a safeguard against giving "Pentothal" intravenously to that rare patient who possesses an idiosyncrasy to barbiturates.

Thirty to forty-five minutes before operation I give an injection of one-sixth of a grain of morphine, one one-hundred-and-fiftieth of a grain of atropine, and one one-hundred-and-fiftieth of a grain of hyoscine (or more or less, according to circumstances). Atropine is essential to combat the parasympathetic hyperactivity produced by the barbiturates.

#### Administration.

Solutions of "Pentothal" were first made up in 10% concentration and then 5%; some workers use a concentration as low as 1 in 1,000. To avoid confusion and to seek consistent results, I prefer to use a 5% solution at all times. This is represented by 0.5 gramme dissolved in 10 millilitres of sterile distilled water.

Solutions of "Pentothal" may be kept as long as forty-eight hours without deterioration. Personal communications from medical officers of the United States Army indicate that solutions have been found satisfactory even after ten days.

It is now generally admitted that there is no way of determining the correct dose of "Pentothal" for any individual patient except by slow and careful administration of the drug at the time of induction. The amplitude of respiration is the chief guide one must follow. Injection must be slow during induction, and especially so until one has gained a reasonable degree of practical experience in the method. The jaw may have to be held and a supply of oxygen should always be on hand against possible need. Should trouble arise in the condition of the patient, two procedures should be kept foremost in mind: (i) the establishment of an airway and (ii) the giving of oxygen.

#### Complications.

Among complications the following may be mentioned.

1. Laryngeal irritability may be manifested as coughing, hiccup or laryngeal spasm. It is due to parasympathetic activity, and as such is largely countered by preliminary medication with atropine. Any mucus present should be aspirated. If the patient is still under light anaesthesia, this may be deepened to relieve the condition. However, if the patient is already deeply anaesthetized, oxygen will probably be required.

2. Trismus in my opinion is not much seen. It is also a parasympathetic manifestation, and is said to be abolished by further atropine and by the giving of oxygen under pressure.

3. Respiratory depression is the only common complication to be anticipated when the anaesthetic technique is poor. It signifies that overdosage has occurred, and it calls for the cessation of "Pentothal" administration (permanently or for the time being) and for the administration of oxygen.

4. Allergy to barbiturates may be present. Rare instances of urticaria and other rashes have been reported, due to hypersensitivity to the barbiturate group. It is thought that by the giving of "Nembutal" the night before operation this condition may be discovered in time to prevent administration of "Pentothal".

5. Post-anaesthetic respiratory depression is another possible complication. Failure of the patient to arouse shortly after the termination of operation is to be regarded also as a sign of overdosage. In such a case the patient should be kept warm and given oxygen, and any mucus present should be aspirated from the pharynx. An ampoule of "Coramine" may be given intravenously, the dose being repeated as required. Picrotoxin can be used, an initial dose of six milligrammes being given intra-

venously and followed by a dose of up to 12 milligrammes intravenously at intervals of fifteen minutes until the patient becomes restless; this drug should not be used, however, without full knowledge of its dangers and proper use.

#### References.

- <sup>(1)</sup> R. C. Adams: "Pentothal Sodium Intravenous Anesthesia in Peace and War", *The Journal of the American Medical Association*, September 30, 1944, page 288.
- <sup>(2)</sup> G. J. Thomas: "Intravenous Anesthesia for Orthopedic Surgery", *The Journal of the American Medical Association*, November 17, 1945, page 789.
- <sup>(3)</sup> R. V. Pratt: "A Device for Intravenous Anesthesia", *THE MEDICAL JOURNAL OF AUSTRALIA*, August 11, 1945, page 179.
- <sup>(4)</sup> H. M. Bird: "A Simple Apparatus for Continuous Pentothal", *British Medical Journal*, September 1, 1945, page 289.
- <sup>(5)</sup> W. G. McKinney: "Continuous Pentothal Administration", *British Medical Journal*, December 9, 1944, page 758.
- <sup>(6)</sup> B. Solomons: "Intravenous Anesthesia with Pentothal Sodium", *British Medical Journal*, April 25, 1945, page 592.
- <sup>(7)</sup> F. W. Roberts and E. A. Sellick: "Continuous Administration of Intravenous Anesthesia", *British Medical Journal*, December 25, 1943, page 813.
- <sup>(8)</sup> W. M. Maidlow: "Intravenous Anesthesia", *British Medical Journal*, September 30, 1944, page 432.
- <sup>(9)</sup> D. E. Dunnill: "Apparatus for Continuous Pentothal", *British Medical Journal*, December 16, 1944, page 793.
- <sup>(10)</sup> R. V. Pratt: "A Trocar and Cannula for the Intravenous Administration of Intravenous Fluids", *THE MEDICAL JOURNAL OF AUSTRALIA*, May 4, 1946, page 629.

### THE EFFECT OF INTRAVENOUSLY ADMINISTERED ANTIMONY COMPOUNDS ON PYOGENIC SKIN LESIONS.

By A. T. H. JOLLY,

Captain, Australian Army Medical Corps.

THE investigation into the effects of intravenously administered antimony compounds on pyogenic skin diseases, including a tropical skin disease, *granuloma pudendi*, has been carried out in some 105 cases. In this paper only the common skin diseases will be dealt with, and the results are of interest, as they lend support to the view that antimony compounds are not specific for the virus thought to cause granuloma.

It was noticed that certain pyogenic skin lesions healed rapidly during the routine course of antimony treatment given for *granuloma pudendi*, and the effects of antimony were tried on a variety of pyogenic skin conditions, both in tropical and in temperate climates.

A review of the literature on similar work is instructive. Only one worker, W. Bain,<sup>(1)</sup> actually used antimony as a therapeutic agent for pyogenic skin diseases, and this was given orally. He makes the following statement: "Having recently demonstrated to my own satisfaction and as far as is possible with the limited number of cases at my disposal, the great benefit to be derived from the use of antimony in chronic and subacute skin diseases, I have recorded the following." He then goes on to describe two cases, one of *acne rosacea* and the other of *syccosis nucha*, in which one-sixteenth of a grain of antimony potassium tartrate was administered three times a day after meals. In both cases the lesions had been resistant to other forms of treatment. In the former the condition cleared up in three weeks, and in the latter rapid improvement occurred with clearing of the syccosis and the accompanying boils in ten days or so. Bain also indicated that he had used the drug successfully for ulcerated legs.

F. G. Cawston<sup>(2)</sup> used tartar emetic intravenously for the treatment of venereal diseases of natives when arsenicals were not available to him. He described no specific cases, but reviewed his results. He found that tartar emetic in intravenous doses of 0.5 grain to 1.5 grains per day was particularly effective for chancroids, multiple syphilitic sores and syphilitic keratitis, and was also useful in cleaning up chronic urethral discharges when mixed infection had supervened on gonorrhoea. In another paper Cawston<sup>(3)</sup> described four cases of syphilis treated by tartar emetic or by antimony sodium tartrate,

the maximum doses being 1.75 grains and 2.0 grains respectively given intravenously, either daily or on alternate days in three millilitres of water. The first patient had tertiary syphilis with keratitis, syphilides of the face and anal condylomata. The rash and keratitis disappeared after six days (4.75 grains, total dosage) and the anal condylomata were dry; but owing to official interference no further treatment was given. The second patient had syphilides of the scrotum and received 9.5 grains in twelve days, the lesions becoming dry and clean on the third day. The third patient received 23.8 grains of tartar emetic in thirty-two days, with seven grains of potassium iodide and one drachm of *Liquor Hydrargyri Perchloridi* three times a day. This resulted in healing of his generalized skin syphilides to the stage of desquamation; the patient then absconded while his Wassermann reaction was still strongly positive. The fourth patient had leucodermic syphilides of both forearms, paronychia of the fingers and toes, and ulceration of the right nostril and the corners of the mouth. Treatment resulted in the clearing of the ulcers by the fourth injection and in rapid healing of the leucoderma. He also received potassium iodide and *Liquor Hydrargyri Perchloridi* when the antimony therapy had ceased. In six weeks from the commencement of treatment his response to the Wassermann test had changed from strongly positive to negative.

H. Goodman<sup>(4)</sup> described four cases of chancroid treated with five millilitres of 1% tartar emetic solution as often as every second day, if necessary with an increment of one millilitre per dose up to twelve millilitres. In one case complete healing followed eight injections of five millilitres at intervals of five days; in a second case complete healing followed four injections given at intervals of three or four days; in a third case improvement occurred, but the patient absconded after four injections; and the fourth patient received four injections, but no statement was made of his condition at the end of the treatment.

Stitt<sup>(5)</sup> noted the effect of intravenously administered tartar emetic on certain yaws ulcers which failed to respond to arsenicals. "In many such cases the healing is greatly enhanced by weekly intravenous injections of a 1% solution of tartar emetic, the initial dose being 5 c.c.s."

Tartar emetic is specific for leishmaniasis and is also used in trypanosomiasis. It is also specific for the trematode of schistosomiasis. It is used with doubtful results in the treatment of filariasis. *Larva migrans*<sup>(6)(7)</sup> is another condition for which tartar emetic or antimony compounds are sometimes curative. Lastly, tartar emetic has been used in the treatment of trachoma; but the references obtainable from the "Quarterly Cumulative Index Medicus" were unavailable.

#### Administration.

The method used for administering tartar emetic was by the intravenous injection of a 2% solution, usually three millilitres three times a week, or better, two millilitres on alternate days. A 1% solution may also be used successfully. "Anthiomalene" is much less toxic than tartar emetic and may be given in intravenous doses of two millilitres per day until improvement commences, and thereafter every second day. Apart from occasional nausea or transient joint pains after injection, no ill effects were encountered.

#### Reports of Cases.

Seven cases in which dramatic results were obtained are recorded in detail. An eighth case is also given in detail, as in it purely negative results were obtained. Besides these, the results obtained in 36 cases of common pyogenic skin lesions have been summarized in Table I.

CASE XXV.—W.M. was first examined on October 10, 1943, at Perth. The lesion was of three months' duration, having started with a pustule on the dorsum of the right forearm near the wrist and gradually spread to an ulcer two and a half inches in diameter. The floor consisted of sloughing, purulent, unhealthy granulations involving the entire dermis sloping upwards to the edge. The edge was a quarter of an inch in width, raised and reddened with

TABLE I.  
Treatment of Pyogenic Skin Infections with Tartar Emetic Given Intravenously.

Case Number and Date.	Name, Sex and Age (Years) of Patient.	Disease and Bacteria.	Part Affected.	Treatment Before Antimony.	Millilitres of Tartar Emetic or Antimony Compound.	Local Treatment During Antimony Therapy.	Comments and Results.
I. 11/8/41.	H.M., male, 26.	Pustular folliculitis. Gram-negative diplococcus.	Thighs and legs.	<i>Unguentum Hydrargyri Ammoniaci Dilutum.</i>	62 mls (2%)	Nil.	Improved to apparent complete resolution, but recurred two weeks after cessation of treatment. Tropical.
II. 8/4/41.	K.McL., male, 36.	Acne, <i>sycois barbae</i> , mixed organisms.	Face and neck.	—	38 mls (2%)	Hot bathing, expression of comedones.	Sycosis cured, but recurred two weeks after cessation of treatment. Acne relieved. Tropical.
III. 23/3/41.	J.T., female, 34.	Pustular folliculitis, staphylococcus.	Left axilla.	—	3 mls (2%)	—	Completely resolved three days from only injection. No recurrence to 15/2/42. Tropical.
IV. 12/12/41.	L.McL., female, 28.	Pustular folliculitis, staphylococcus.	Mouth, chin, neck, axillae.	—	24 mls (2%)	—	Completely resolved in 10 days. No recurrence to 15/2/42. Tropical.
V. 9/9/41.	I. (Japanese), male, 35.	Chronic <i>sycois barbae</i> , mixed organisms.	Face, neck.	—	36 mls (2%)	—	Improved, but on cessation of treatment as bad as ever by 26/12/41. Tropical.
VI. 14/6/41.	T.McD., male, 19.	Acne, mixed organisms.	Face, neck, back.	—	67 mls (2%)	Expression of comedones.	Improved, but on cessation of treatment condition became severe again in six weeks. Tropical.
VII. 30/6/41.	I. (Native), male, 20 to 25.	Pustular folliculitis, indolent ulcer, mixed organisms, staphylococcus.	Left leg.	<i>Unguentum Hydrargyri Ammoniaci Dilutum.</i>	18 mls (2%)	—	Healed in two weeks, no recurrence to 15/2/42. Tropical.
VIII. 17/9/42.	E.F.C., female, 38.	Furunculosis, staphylococcus.	Forearms.	—	$\frac{1}{2}$ grain three times a day after meals for seven days. $\frac{1}{4}$ grain three times a day after meals for 21 days.	—	Old lesions healed, no fresh lesions to 22/10/42. Temperate.
IX. 31/10/42.	R.L.A., male, 28.	Furunculosis, carbuncle, staphylococcus.	Neck.	—	12 mls (2%)	—	Healed; no fresh lesions reported. Temperate.
X. 2/10/42.	R.S., male, 43.	Chronic furunculosis, staphylococcus.	All areas of body.	Staphylococcal toxoid.	60 mls (2%)	—	In the following two years only two boils. Prior to that, average two per month. Temperate.
XI. 31/10/42.	L.J.M., male, 23.	Furunculosis, staphylococcus.	Neck, arms, face.	—	23 mls (2%)	—	Old lesions healed except for subcutaneous abscess, which was opened. No recurrences after two years. Temperate.
XII. 17/7/42.	F.D.M., female, 28.	Chronic furunculosis, staphylococcus.	Face.	Staphylococcal toxoid.	135 mls (2%)	—	No fresh lesions to 17/8/42. First time face free from boils for over twelve months. Recurred, 20/12/42, fresh course, with healing. Recurred 20/3/43, fresh course, with healing. Recurred 8/6/44. Temperate.
XIII. 5/10/42.	W.D., male, 33.	Carbuncle, furuncle, staphylococcus.	Right forearm.	—	38 mls (2%)	—	Carbuncle localized and healed rapidly by 19/10/42. On 16/10/42 boil developed, healed 22/10/42. Boil 9/11/42. No further lesions to 10/10/44. Temperate.
XIV. 27/7/42.	M.O., female, 16.	Furunculosis, staphylococcus.	Left axilla and arm.	—	21 mls (2%) $\frac{1}{4}$ grain three times a day after meals for three weeks.	—	Lesions cleared by 15/8/42. Course finished 17/8/42. On 9/10/42 three boils on face, arm and chest, clear again 26/10/42. Temperate.
XV. 22/8/42.	M.D., female, 18.	Furuncle, cellulitis, staphylococcus.	Forehead, nose, left orbit.	Sulphonamide drugs.	11 mls (1%) 10 mls "Fouadin".	—	Lesion growing worse with sulphonamide drugs. Lesion healed 11 days after first injection of tartar emetic. No recurrence until 13/10/42, then small boil on forehead, which healed rapidly. Temperate.
XVI. 24/7/42.	W.H., male, 30.	Chronic furunculosis, staphylococcus.	All areas of body.	Staphylococcal toxoid.	48 mls (2%)	—	Six hundred boils in twelve months previous to tartar emetic. Lesions healed rapidly, no fresh ones after 8/8/42. Clear two years later. Temperate.



TABLE I.—Continued.  
*Treatment of Pyogenic Skin Infections with Tartar Emetic Given Intravenously.—Continued.*

Case Number and Date.	Name, Sex and Age (Years) of Patient.	Disease and Bacteria.	Part Affected.	Treatment Before Antimony.	Millilitres of Tartar Emetic or Antimony Compound.	Local Treatment During Antimony Therapy.	Comments and Results.
XVII. 28/6/42	J.B., male, 32.	Carbuncle, furunculosis, staphylococcus.	Forearm.	—	21 mls (2%)	—	All lesions healed by 8/7/42. No recurrence two years later. Temperate.
XVIII. 16/10/42.	R.L., female, 28.	Furuncle and cellulitis, staphylococcus.	Upper lid.	—	4 mls (2%)	—	Lesions resolved by 20/10/42. Recurrence reported. Temperate.
XIX. 4/7/42.	F.McK., male 39.	Furunculosis, chronic sty, staphylococcus.	All areas, left upper lid.	—	24 mls (2%)	—	Lesions all healed by 16/7/42. No recurrence reported. Temperate.
XX. 23/9/42.	M.N., female, 41.	Pustular folliculitis, ulcers, staphylococcus.	Right wrist.	<i>Unguentum Hydrargyri Ammoniaci Dilutum</i> , mercuric chloride compresses.	12 mls (2%)	<i>Unguentum Hydrargyri Ammoniaci Dilutum</i> .	Lesions healed by 29/9/42. No recurrence two years later. Temperate.
XXI. 21/9/41.	W.V., male, 61.	Chronic erysipelas, staphylococcus.	Nose.	<i>Unguentum Hydrargyri Ammoniaci Dilutum</i> .	36 mls (2%)	—	Lesion healed by 20/10/42. No recurrence two years later. Temperate.
XXII. 7/8/42.	E.E., female, 15.	Indolent ulcer, mixed organisms.	Left ankle.	<i>Unguentum Hydrargyri Ammoniaci Dilutum</i> , gentian violet.	51 mls (2%)	—	Lesion improved but did not heal. Temperate.
XXIII. 27/10/42.	E.P., female, 27.	Chronic ulcers.	Mouth.	Numerous forms.	48 mls (2%)	Silver nitrate mouth wash.	No improvement. Temperate.
XXIV. 9/6/42.	J.W.T., male, 26.	Impetigo, streptococcus and staphylococcus.	Limbs, buttocks.	—	39 mls (2%)	—	No improvement. Temperate.
XXV. 10/10/43.	W.M., male, 69.	Pustular folliculitis with chronic indolent ulcer, mixed organisms.	Right forearm.	Numerous forms, including silver nitrate.	108 mls (2%)	Painting with silver nitrate.	Improved and became less painful after first injection. Completely healed in three months. No recurrence one year later. Temperate.
XXVI. 25/5/42.	R.D.R., female, 20.	<i>Acne vulgaris</i> , mixed organisms.	Face.	—	48 mls (2%)	Comedones expressed, facial massage, hot bathing.	Marked improvement, face clear at end of treatment. No recurrence six months later. Temperate.
XXVII. 25/6/42.	M.McK., female.	<i>Acne vulgaris</i> , mixed organisms.	Face.	—	45 mls (2%)	Comedones expressed, hot bathing, facial massage.	No improvement. Temperate.
XXVIII. 16/10/42.	J.J.F., male, 25.	<i>Acne vulgaris</i> , mixed organisms.	Face, neck, back.	Nil.	60 mls (2%)	Comedones expressed, hot bathing, sun bathing.	Marked improvement with only an occasional pimple by 7/12/42. Improvement has remained up to 12/4/46. Temperate.
XXIX. 21/5/45.	W.C.M., male, 31.	Pustular folliculitis, staphylococcus (two years).	Axilla.	Considerable local treatment.	54 mls (1%)	Silver nitrate.	Lesions healed. No recurrence of condition to 13/8/45. Tropical.
XXX. 21/5/45.	R.F.R., male, 30.	Pustular folliculitis, staphylococcus (four months).	Axilla.	Local treatment.	30 mls (1%)	Silver nitrate.	Lesions healed. No recurrence to 23/8/45. Tropical.
XXXI. 21/5/45.	K.N.R., male.	Pustular folliculitis, staphylococcus (six months).	Axilla, crura.	Local treatment.	36 mls (1%)	Silver nitrate.	Improved. Recurred in crura 7/6/45, but not in axilla. Course renewed 10/8/45. Tropical.
XXXII. 5/12/45.	J.B.J., male, 27.	Pustular folliculitis, tropical ulcer, staphylococcus.	Left leg.	Penicillin locally and intramuscularly.	16 mls (2%)	Penicillin intramuscularly only. About 1,800,000 units.	Healed completely in fourteen days. Tropical.
XXXIII. 9/1/46.	A.J., male, 36.	Pustular folliculitis, furunculosis, staphylococcus.	Right axilla.	Gentian violet and silver nitrate applications.	16 mls (2%)	Nil.	Healed in fourteen days. Recurred 6/3/46. Tropical.
XXXIV. 4/2/46.	K.F., male, 30.	Furunculosis, pustular folliculitis.	Axilla, crura.	Much previous treatment of local nature.	10 mls "Anthiomalene".	Nil.	Furuncles resolved completely after five days. Folliculitis greatly diminished. Tropical.
XXXV. 10/5/46.	M.S., female, 15.	Furunculosis, acne (three months).	Face.	Nil.	36 mls (2%)	Facial massage.	Both acne and furuncles cleared in four weeks. One fresh furuncle during course. Temperate.
XXXVI. —/4/43.	A.P., male, 24.	Boils, septic abrasions (two years).	All areas.	Local treatment only.	45 mls (2%)	Nil.	All lesions healed, no fresh ones during course. No recurrence three years later. Temperate.

pustules arising from the hair follicles and sinuses burrowing through the dermis, some of which connected to form superficial fistulae. The area was extremely painful and had failed to respond to all local measures, which included applications of silver nitrate, gentian violet and other drugs. The patient was given three millilitres of a 2% solution of tartar emetic intravenously three times a week. This resulted in immediate healing from the edge inwards with amelioration of pain, the only other measure being the painting of the edge with 2% silver nitrate solution. In three months the lesion had completely healed, a smooth scar dotted by papilloma-like nodules of incompletely destroyed hair follicles being left. Up to one year later there was no recurrence.

CASE IX.—R.S. was first examined on October 2, 1942, at Perth. He had suffered from boils for years, being never without one for more than a few days. He had received much treatment in the past, including a course of staphylococcal toxoid. He was given three millilitres of a 2% solution of tartar emetic intravenously three times a week for six weeks. During the course he developed two fresh boils, but over the next two years he developed only two more. Examination of a smear revealed staphylococci.

CASE XVI.—W.H. was first examined on July 24, 1942, at Perth. He said that he had had over 600 boils in the previous twelve months, and on examination sixteen furuncles and boils were counted on his body besides numerous scars. He was given a five weeks' intravenous course of 2% tartar emetic solution, three millilitres being given three times a week. During this time he developed only three fresh lesions; no fresh lesions appeared over the next two years. Examination of a smear revealed staphylococci.

CASE XV.—M.D. was first examined on August 28, 1942, at Perth. She had a large furuncle on the outer side of her left eyebrow, which she had squeezed. Cellulitis developed, which spread to her left orbit, her nose and her right eyelids. The patient was sent to hospital and given massive doses of sulphapyridine. When I first examined her, she had been under treatment for seven days and she was extremely toxæmic; both her eyes were completely closed by the massive cellulitis. The conjunctiva of the left eye was red, purulent and oedematous. No penicillin was then available, and she was given intravenously five millilitres of a 1% solution of tartar emetic. On the following day the swelling had subsided and she could open her eyes. Three furuncles on her chin, forehead and left cheek had started to subside. On the third day, after the first injection, she received intravenously six millilitres of a 1% solution of tartar emetic, and subsequently she received two intramuscular injections of "Fouadin" (a proprietary antimony compound). Eleven days after the first injection she was able to return home. Apart from two styes on her lower left lid, no fresh lesions developed in the next two months; after this a small furuncle developed on her forehead, but rapidly subsided. Examination of a smear revealed staphylococci.

CASE XXXIII.—Captain A.J. (myself) was the patient at Balikpapan, and injections were administered by Major R. D. Ferris. Pustular folliculitis developed in the right axilla on January 9, 1946. This was treated with gentian violet and silver nitrate applications (3%) twice a day with frequent heliotherapy. Three days later the lesions had completely vanished; but on January 14 examination of the axilla revealed three early furuncles, with painful redness and thickening in the surrounding tissue. Silver nitrate applications and heliotherapy were continued for four days, but several fresh lesions developed and there was no improvement. On January 18 two millilitres of a 2% solution of tartar emetic were administered, and all other treatment was suspended. The injections were continued on every second day until February 4. During the course some half-dozen superficial follicular lesions developed, and at the end of it all lesions had healed completely. On March 6, whilst the patient was in the region of the Equator, the superficial pustular folliculitis reappeared at the periphery of the right axilla in the less hairy region, and a few pustules also appeared in the right groin in the less hairy region. Five days later, whilst the patient was still in the tropics (New Britain), the axillary lesion became much worse, but still remained at the periphery, forming a ring of pustules around the more central hairy region. The groin lesion was also worse. No treatment at all was given, in order to see the effect of a temperate climate on the lesion. The lesion started to decrease as soon as the tropics were left on March 13. By March 22 the axillary lesions had resolved. A few fresh pustules were developing in the groin, but these cleared up early in the following month.

Examination of a smear from the first lesions revealed staphylococci.

CASE XXXII.—Sergeant J.B.J. This patient was first examined at the 2nd/2nd Casualty Clearing Station at Balikpapan on December 5, 1945. He gave a history of a pustule which had developed in the scar of an old burn five or six weeks before. The lesion had spread rapidly to form a wide ulcer, and he was evacuated to the 2nd/4th Field Ambulance, where he received local dressings with penicillin powder and hot saline bathings. The lesion continued to spread and deepen, and he was then sent to the 2nd/2nd Casualty Clearing Station with a diagnosis of tropical ulcer. Examination revealed a large ulcer on the outer side of his left calf six inches long and three inches wide. Towards the centre the whole thickness of the dermis was involved by grey, purulent granulations, the base shelving upwards to the edge. In the peripheral regions of the base, hair follicles were still visible, whilst the edge was reddened and slightly raised, and contained numerous follicular pustules. Follicular pustules spread out over an area varying from two to three inches from the edge. The same treatment was continued, and on December 6, 20,000 units of penicillin were given five times a day intramuscularly. On December 9 the ulcer was still spreading, and the follicular pustules now involved over half the leg. Two millilitres of 2% tartar emetic solution were given every second day for fourteen days, and the intramuscular administration of penicillin was continued for this period. Two days after the first injection of antimony, islands of epithelium were seen developing around the follicles present in the ulcer, and in seven days the ulcer was obviously healing rapidly. During this period the patient contracted a mild generalized moist dermatitis involving mainly his limbs, face and scalp. This, however, cleared up rapidly. At the end of the course the ulcer had healed completely, the central deeper region being covered by a dry, clean scab, and all pustules had cleared up. Up to December 30 there was no recurrence, and the patient was evacuated to Australia. Examination of a smear revealed mixed organisms, mainly staphylococci.

CASE XXXIV.—Captain K.F. was first examined on February 4, 1946, at Balikpapan. He had suffered from pustular folliculitis of the axillae and crural regions for the twelve months of his stay in the tropics. In the last two weeks lumps had appeared in his axillae which were red and painful. Examination revealed red and thickened skin in both axillae, with raised areas of early furuncles; there was no enlargement of axillary glands. Examination of the crural regions showed superficial follicular pustules only. The patient was given two millilitres of "Anthiomalene" intravenously every day for five days, during which period the axillary lesions completely resolved and the crural lesions decreased. He then left for Australia, and was supplied with three more ampoules of "Anthiomalene", to be administered every second day on the voyage. So far no further information has been obtained.

CASE XXIV.—J.W.T. was first examined on June 9, 1942, at Perth. He complained of sores on his limbs and buttocks of several weeks' duration. Examination revealed extensive encrusted pustular impetiginous lesions on his limbs and buttocks, and on the lower part of his abdomen. He was given three millilitres of 2% tartar emetic solution three times a week for four weeks, with no improvement at all, and he apparently sought treatment elsewhere. Examination of a smear revealed mainly staphylococci and streptococci.

### Summary.

Thirty-six cases are cited in Table I, which includes the eight cases given in more detail. Sixteen patients suffered from boils, carbuncles or furuncles; two of these also had pustular folliculitis and one had acne. Twelve had pustular folliculitis, and four of these also had ulcers; two also had furuncles. Six had *acne vulgaris*, and one of these also had *sycosis barbae* and one furunculosis. Two had *sycosis barbae*, of whom one also had acne. Five had ulcers, of whom four also had follicular involvement. There was one case each of impetigo, oral ulcers and recurrent erysipelas, the last not being typical, as staphylococci were found in the smear.

All the patients suffering from furuncles and boils responded completely, and only four recurrences were reported. In some of the most severe cases, recurrence was negligible or absent after two or three years.

All the patients suffering from pustular folliculitis responded, all but four completely and without recurrence.

Those four patients who also had ulcers and folliculitis responded completely and permanently.

The one patient who had a chronic ulcer but no follicular lesion responded slowly, but the ulcer failed to heal.

Both patients with *sycosis barbae* improved, but their condition rapidly deteriorated on cessation of treatment.

All but one of the five patients suffering from acne improved, and those who also had regular local treatment retained the improvement.

The patient suffering from so-called erysipelas responded completely without recurrence.

The patients with oral ulcers and impetigo failed to respond.

Only one case was reported in which "Anthiomalene" treatment was used; the records of two other cases, one of *sycosis barbae* which responded completely and permanently, and one of severe acne which was vastly relieved, are not at present on hand, and will be included with the above-mentioned case in a larger paper.

#### Comments.

Antimony has a known affinity for keratin, and this should probably be taken into account when its wide application in skin therapy is considered.

It is most unlikely that antimony is specific for bacteria, spirochaetes, possible virus lesions and larvæ, for in view of its effect on the protozoa of leishmaniasis and on the trematode of schistosomiasis, it would then be a specific for almost all types of parasites known to invade the body. For the present it would be better to place all skin lesions, including syphilitic lesions and those due to larvæ, in a separate category, the therapeutic effect being due to the deposition of antimony in skin, only leishmaniasis and schistosomiasis being left for its truly specific effects.

I have treated some 55 patients suffering from *granuloma pudendi*, of whom the majority reacted to the Kline test. All of these received antimony therapy, and even after prolonged and multiple courses none ceased to react to the Kline test. In this respect my experience differs from that of Cawston. Nevertheless many of these patients subsequently received intensive anti-syphilitic treatment with arsenicals and bismuth, and only one ceased to react to the Kline test. It is possible that antimony in common with other heavy metals has a therapeutic value in the treatment of yaws and syphilis.

#### Conclusions.

1. Thirty-five cases of suppurative skin lesions and one of an oral lesion treated by the intravenous administration of antimony preparations are cited.
2. The follicular type of lesion appears to respond to antimony therapy.
3. Antimony is known to have an affinity for keratin.
4. The one mucous membrane lesion cited failed to respond to antimony.
5. The commonest organism found in the lesions was the staphylococcus.

#### Acknowledgements.

I wish to thank Major-General S. R. Burston for permission to publish this paper.

#### References.

- (1) L. W. Bain: "Antimony Treatment of Acne Rosacea", *British Medical Journal*, July 13, 1929, page 51.
- (2) F. G. Cawston: "Freshly Dissolved Tartar Emetic in Venereal Disease", *The Journal of Tropical Medicine and Hygiene*, May 15, 1922, page 126.
- (3) F. G. Cawston: "Antimony in Syphilis", *British Medical Journal*, February 18, 1922, pages 266 and 296.
- (4) H. Goodman: "Treatment of Chancroid with Tartar Emetic Solution Intravenously", *The Journal of Urology*, April, 1925, page 489.
- (5) E. R. Stitt: "The Diagnostics and Treatment of Tropical Diseases", Fifth Edition, 1929, Chapter 10, page 173.
- (6) D. C. Smith: "The Treatment of Creeping Eruption with Sodium Antimony Biscatechol", *The Journal of the American Medical Association*, November 13, 1943, page 694.
- (7) S. Rubin: "Creeping Eruption", *The Journal of the American Medical Association*, March 4, 1944, page 668.

## Reports of Cases.

### A CASE OF ACQUIRED HÆMATOCOLPOS IN ADOLESCENCE DUE TO TRAUMA IN EARLY CHILDHOOD.

By MARCUS M. KENNEDY, M.B., B.S., F.R.C.S. (Edinburgh),  
Sydney.

HÆMATOCOLPOS is usually classified as due to congenital or acquired causes, and the latter form almost exclusively occurs in older women, subjects of senile vaginitis. The purpose of this communication is to record an unusual case, inasmuch as the cause appears to have been trauma in early childhood.

#### Clinical Record.

Miss L.P., aged sixteen years, was born and had lived all her life in the Saint George district of New South Wales. She was referred to the gynaecology clinic of the Saint George District Hospital by her family doctor on account of a lower abdominal tumour, and examined there on January 11, 1946. No exanthemata or other acute illnesses had occurred, but the child had always been "puny" and had never put on weight to the satisfaction of her mother. At the age of five years she had sustained a perineal injury, when she fell astride the upwardly-directed rungs of the back of a chair; one rung, according to her mother "entered deeply into the front passage". Her own doctor sutured the perineum externally, and referred the patient to the casualty department of the Saint George District Hospital for further observation. As hæmorrhage continued, several more stitches were there inserted "in the front passage". The mother stated that the doctor's original sutures were later removed, but that the hospital sutures "dissolved themselves". No further trouble had been experienced until December, 1945, since when the patient had had several attacks of lower abdominal pain and pain in the upper parts of the thighs, lasting for one or two days. She had been aware of a "full stomach" for "some little time", but was unaware of a definite swelling until this was pointed out by her family doctor on December 28. She had never menstruated and had never been conscious of any symptoms suggestive of a menstrual cycle.

On examination on January 11, 1946, the patient was seen to be an auburn-haired, fair-skinned girl, five feet two inches high and six stone four pounds in weight. Secondary sex characteristics were developed but somewhat immature; the hip lines were not prominent, the bust was under-developed, and the pubic and axillary hair was scanty. In manner she was young for sixteen years. No abnormality was detected on examination of the cardio-vascular, respiratory, central nervous or alimentary systems. A firm, rounded, slightly tender mass was present, extending from the pubis to the umbilicus; it was moderately well defined, was four inches in breadth, and was unaffected by catheterization. On vaginal examination tags of hymen could be identified, and three-quarters of an inch further along the vagina was completely obstructed by a firm, puckered, skin-coloured obstruction. This was tense, and whilst not actually bulging, gave the impression of firm fluctuancy on bimanual examination over the abdominal tumour. No adnexæ could be palpated.

Operation was carried out under general anaesthesia ("Kelene"-ether sequence) on January 15, 1946. The vaginal obstruction was carefully probed for any sign of continuity of lumen, but only strong resistance was encountered. Thereupon an incision was made immediately posterior to the transverse line upon which the puckered folds converged. An anterior and a posterior layer of mucous membrane were thus produced, and firm fibrous tissue was displayed, which was likewise incised transversely. A tense bluish sheet immediately bulged through the opening made. This sheet was opened by insertion of sinus forceps, and thick, viscid, chocolate material at once filled the lower part of the vagina and escaped to the exterior—in all three and a half pints; this was later



proved to be "old blood with a fibrous clot". A small cervix could be palpated digitally, but not visualized. The external os was a transverse slit which would not admit the finger-tip. The transverse incisions were widened to one and a half inches by further splitting with the fingers, and the inner and outer layers of mucous membrane were sutured one to another over the middle fibrous layer both anteriorly and posteriorly, eight interrupted silk sutures being used. A small iodoform gauze wick was placed in the power part of the vagina. On the patient's return to the ward a prophylactic course of 300,000 units of penicillin and 24 tablets of sulphathiazole was embarked upon, and she was nursed in the Fowler position.

The second stage of the operation was carried out on January 29, under general anaesthesia with "Kelene". The sutures were removed, the vaginal wound was dilated and the pelvis was examined. Visual examination of the cervix disclosed this to be of the "multiparous" type, with small but definite anterior and posterior lips. The os was closed. The uterus was of normal adult size, in the anterior position and of mature proportions. The ovaries, but not the Fallopian tubes, were now palpable.

No further pain or discomfort has been experienced by the patient. Menstrual periods have occurred every twenty-six or twenty-seven days since the operation and have lasted for four or five days. Each month, digital dilatation of the vaginal wound has been performed; by July 30 it had narrowed to three-quarters of an inch in diameter. On this latter date, under general anaesthesia ("Kelene"-ether sequence), a further plastic operation was carried out; two lateral bands of cicatrix were incised and during the first three days of healing dilatation was carried out by an indwelling Ferguson's speculum. On the same date a salpingogram was taken, after the injection of five millilitres of lipiodol into the cervix. The salpingogram revealed that the right Fallopian tube was patent, but the left was probably occluded; the uterus was in the mid-line position. Slight irregularity in outline was present towards the lower part of the sacrum, and there was a strong suggestion that the uterus approached the bicornuate type.

#### Discussion.

Hæmatocolpos may be associated with hæmatometra, and perhaps with hæmatosalpinx, or may occur alone. In hæmatometra without hæmatocolpos, congenital malformations at or above the cervix, or trauma to the cervix, usually at childbirth or operation or from radium, may give rise to the condition. The vast majority of cases of hæmatocolpos, with or without hæmatometra, are due to congenital defects, most commonly imperforate hymen or else to a constricting membrane a short distance above the hymen. In cases in which a considerable length of vagina is imperforate, this is due to defective fusion of the two Müllerian ducts, and then the cervix is usually without lumen also. Hæmatometra will occur only when the uterus is sufficiently developed for menstruation to take place.

Of the much less commonly occurring acquired hæmatocolpos, the least rare cause is senile vaginitis, the vaginal walls becoming adherent following denudation of the vaginal epithelium. Since the patients are mostly examined after the menopause, symptoms arise only when hæmorrhage occurs from a pathological lesion—for example, fibrosis or carcinoma.

An interesting historical review of the literature appears in *Surgery, Gynecology and Obstetrics* of September, 1928,<sup>(1)</sup> and a discussion of the eleven cases of hæmatocolpos at the Mount Sinai Hospital, New York, from 1917 to 1937, appears in the *American Journal of Obstetrics and Gynecology*, Volume XXXVII of 1939.<sup>(2)</sup> It is worthy of notice, however, that in the latter discussion the hymen is regarded as the junction of that portion of the vagina derived from the Müllerian (paramesonephric) ducts and that part derived from the urogenital sinus. I prefer the explanation put forward by Koff<sup>(3)</sup> that the hymen is the remnant of the lower extremity of the sinovaginal bulbs where these arise from the urogenital sinus and that the junction of the fused Müllerian ducts with the upper extremity of the sinovaginal bulbs marks the site of a congenital constricting membrane, at the approximate

site of the membrane in the patient under discussion. Hence, again as in the case under discussion in this communication, tags of hymen may be found below and distinct from the constricting membrane.

In the congenital type the obstruction is almost always complete from the beginning; but in the acquired type, and more particularly in primary hæmatometra, there is not infrequently a period during which the occlusion is only partial. The obstruction may quickly become complete, or may remain incomplete indefinitely.

Even in infancy, distension of the pelvic viscera, hydrometrocolpos, has been described, and Paul Morris of Philadelphia has found seventeen cases in the literature, adding one of his own.<sup>(4)</sup> Veit<sup>(5)</sup> goes to the length of asserting that true congenital imperforate hymen produces symptoms in the first six months of life, and is due to intrauterine malformation or to infection from amniotic fluid. He also states that imperforate hymen producing symptoms at the onset of menses is due to vaginitis acquired during childhood, and that such vaginitis may be secondary to acute febrile illnesses—for example, scarlet fever or typhoid fever—or it may result from irritating urine or faeces; the gonococcus is a well established offender.

In congenital hæmatocolpos symptoms are usually said to be in abeyance until after the menarche, when recurring symptoms of menstruation are observed without evident hæmorrhage; the severity increases with each menstrual cycle, until eventually the parent realizes that something is amiss and seeks medical advice.

It is remarkable that in the literature now available to me, no case has been described of acquired hæmatocolpos due to trauma in the earlier years of life. The case under discussion is regarded as acquired, on account of the following findings: (i) the history of trauma followed by vaginal suture in the casualty room, when the child was aged five years; (ii) the entire absence of bulging, the puckered appearance of the mucous membrane covering the constricting membrane, and the scar-tissue appearance and texture of the latter; (iii) the apparently normal cervix, though slit-like and reduced in length, the normal uterus and ovaries, and the normal rhythm of subsequent menstruation.

In support of the possibility that this case may be an instance of congenital obstruction, must be cited the generally under-developed appearance of the patient, the radiological suggestion of bicornuate uterus, and the fact that the site of the obstruction coincides with an elected site for a congenital constricting membrane.

#### Summary.

Reference has been made to the literature on hæmatometra, and a distinction has been drawn between this condition and hæmatocolpos. Reference has also been made to the literature on hydrometrocolpos in infancy. Two opposing views have been given on the origin of the hymen, and the bearing of these on the interpretation of the histogenesis of congenital constricting membrane and of imperforate hymen has been stated. A case of hæmatocolpos in an adolescent has been described, and reasons have been given for considering this to be a case of acquired hæmatocolpos, which is rare in this age group.

#### Acknowledgement.

I am indebted to Dr. R. I. Furber, Honorary Consulting Gynaecologist to the Saint George District Hospital, for his advice.

#### References.

- <sup>(1)</sup> H. E. Simon: "Hæmatometra; Report of 23 Cases", *Surgery, Gynecology and Obstetrics*, Volume XLVII, September, 1928, page 356.
- <sup>(2)</sup> P. Bernstein and R. I. Walter: "Hæmatometra", *American Journal of Obstetrics and Gynecology*, Volume XXXVII, 1939, page 126.
- <sup>(3)</sup> W. J. Hamilton, J. D. Boyd and H. W. Mossman: "Human Embryology: Prenatal Development of Form and Function", 1945.
- <sup>(4)</sup> P. Morris: "Hydrometrocolpos in Infancy: A Cause of Urinary Retention, Intestinal Obstruction and Edema of the Lower Extremities", *The American Journal of the Medical Sciences*, Volume CCX, December, 1945, page 751.
- <sup>(5)</sup> Veit: "*Handbuch der Gynäkologie*", 1908, page 162; cited by P. Bernstein and R. Walter, *loc. citato*.

## Reviews.

### OCULAR PROSTHESIS.

J. H. PRINCE, author of "Ocular Prosthesis", is to be commended for the industry which he has applied to the production of his book.<sup>1</sup> This is of value as an introduction to the subject, but with correction it could be of great benefit to those seeking knowledge in this field.

Owing to inaccuracies, which might have been avoided by reference to authorities in various departments, the book has lost some usefulness, and only the experienced artificial eyemaker may discern where the technical advice is at fault. Actually, the making of artificial eyes, both for stock and for individual requirements, demands a skill and experience which cannot be conveyed adequately in writing.

Apart from inaccuracies, the chief criticism which might be raised is that certain sections are too expansive and might have been curtailed with advantage. The historical section is splendid, but that on anatomy and physiology is unnecessarily detailed with information which is, in any case, readily available elsewhere.

"Fitting the Prosthesis" (Chapter IV) is good, but too elaborate, and the advice given regarding instructions to the eyemaker would perplex him and lead to unsatisfactory results. It is preferable for the eyemaker to fit the patient himself.

"Recording of Artificial Eye Cases" (Chapter VII) is also verbose, and measurements and photographs are not as reliable as replicas, which can be made almost as quickly.

"The Manufacture of Artificial Eyes" (Chapter VIII) is quite misleading where it concerns glass eyes, and the illustrative sketches on page 123 should not be taken seriously. The method of making acrylic eyes is not in accordance with the improved modern technique.

### VENEREAL DISEASES.

The first English edition of "Venereal Diseases in General Practice", by Professor Svend Lomholt, is an English revision of the third edition of his Danish textbook that has been used widely in the Scandinavian countries.<sup>2</sup> The Danish edition had just been printed when Denmark was occupied by the Germans. When the English edition was being prepared Professor Lomholt did not consider it reasonable to rewrite the whole book to incorporate the changes in treatment which had taken place during the eclipse of Denmark. He considered that the addition of a supplement, covering the developments in treatment, would prove sufficient, as knowledge of the clinical aspects of the venereal diseases had not changed since 1940. The supplement of eighteen pages has its own index and brings the book up to date.

As a whole the book is pleasing. It is well illustrated and the type is clear. The coloured illustrations are excellent.

The book deals chiefly with syphilis, gonorrhoea and chancroid, and brief mention is made of less important genital conditions in the venereal disease group. As is to be expected, syphilis claims the major part of the book. The course of this disease is traced through all its stages with more detail than is usually found in small textbooks on venereal disease.

Syphilis is described as a chronic contagious disease which has shown marked decrease in incidence during the last two decades. The primary lesion is clearly described and the illustrations are well chosen to assist in diagnosis. The importance of dark-ground examination is emphasized, so that treatment may be commenced with a minimum of delay as the prospects of successful antisyphilitic treatment are dependent on early diagnosis.

The descriptions of syphilitic skin lesions are full and concise, and here again the illustrations are very helpful. Throughout the book one is guided towards correct diagnosis by one who is apparently accustomed to teach, and the discussions under the heading of differential diagnosis, which follow the various descriptions of syphilitic lesions, are of value in helping one to arrive at a reasonable decision. The section on the treatment of syphilis is brought up to date.

<sup>1</sup> "Ocular Prosthesis", by J. H. Prince, F.B.O.A., F.S.M.C., F.I.O.; 1946. Edinburgh: E. and S. Livingstone Limited. 8½" x 5½", pp. 144, with many illustrations. Price: 17s. 6d.

<sup>2</sup> "Venereal Diseases in General Practice", by Svend Lomholt, M.D. (Copenhagen), M.D. (Honorary, Riga), O.B.E.; 1946. London: H. K. Lewis and Company Limited. 9½" x 6½", pp. 234, with many illustrations, some coloured. Price: 25s. net.

by the supplement, though changes in outlook have occurred since the publication of the book.

Professor Lomholt mentions the combination of penicillin and an arsenical preparation as giving good results and suggests that perhaps a combination of the two methods will become standard treatment in the future. We already observe a definite move towards combined treatment in the United States of America because of variation in the percentage of types of penicillin in the several commercial products. The recommended total minimum dose of penicillin in early syphilis is now 3,600,000 Oxford units instead of 2,400,000 Oxford units, and for seropositive primary and for early secondary syphilis it is recommended that not less than 5,400,000 Oxford units should be given. Where an arsenical is used as well, a total of 360 milligrammes of oxophenarsine hydrochloride or an analogue is recommended given in six individual intravenous injections of 60 milligrammes each twice or thrice weekly, and when bismuth treatment is added six intramuscular injections of bismuth subsalicylate, each of 200 milligrammes, the injections being given twice a week.

The section dealing with gonorrhoea is brief, but, in the light of modern treatment, is adequate. In regard to diagnosis it is mentioned that gonococcal proctitis is rather common in women suffering from gonorrhoea and that it is not infrequently the cause of an otherwise inexplicable infection in the male and of many relapses in the female. In the diagnosis of gonorrhoea in female children it is stated that the diagnosis must never be made without unquestionable microscopic findings and that the most important source of error is the *Micrococcus catarrhalis*. We believe that all such investigations should be supported by the cultivation of the gonococcus from the affected area.

For description of the modern treatment of gonorrhoea one must depend on the supplement as the chemotherapy mentioned in the main part of the book is now almost completely outmoded.

In the supplement penicillin is given as the drug of choice in the treatment of gonorrhoea, and it is stated that "a total dose of 300,000 O.U. will cure any case of gonorrhoea; but on the other hand even a total dose of merely 40,000 units will cure a majority of such cases". It is possible that this statement may be modified by Professor Lomholt as resistant conditions come under notice. He considers a total dose of 100,000 Oxford units sufficient for most cases, and this is the dose used by many at present with good results.

He points out the danger that syphilitic infection may be masked by the use of penicillin in gonorrhoea when the two infections may have been contracted at the same time, and he suggests that it is advisable to keep the penicillin-treated gonorrhoeal patient under supervision with repeated serological tests for up to half a year. He further suggests that it may be justifiable for practical reasons to commence the treatment of gonorrhoea with an effective chemotherapeutic drug—sulphathiazole or sulphadiazine—and to resort to penicillin only if this therapy fails. Where syphilis is not uncommon in a community this seems reasonable if patients will not attend for serological tests over the necessary period.

No mention is made of a translator, so we presume that Professor Lomholt is responsible for the book as published. If this is so he is to be congratulated on the English presentation of his material as well as on his practical outlook.

## Notes on Books, Current Journals and New Appliances.

### A TALE FOR CHILDREN ABOUT THE PLATYPUS.

CHILDREN of all ages will enjoy Dr. A. W. D'Ombra's story "O Nita Rinkus".<sup>1</sup> Jill and Michael learn about the platypus from Mr. Beetle Brown. They sit by a creek and Mr. Brown says that he can see *Ornithorhynchus*. "O Nita what?" asks Michael, and thus Nita gets her name. She has a husband, Mr. Peter Rinkus. Eggs are laid and Nita's nest is described. We also meet Mrs. Dinkus Duck, Mr. Triller Thrush and Mr. John Bull-Dog Ant. Larrikin Larry and Mr. Dirty Dog are the villains of the piece. The tale is charmingly illustrated by Mary M. Abbott.

<sup>1</sup> "O Nita Rinkus: The Story of an Easter Egg", by A. W. D'Ombra; 1946. Sydney: Australasian Medical Publishing Company, Limited. 11" x 8½", pp. 40, with illustrations, some coloured. Price: 12s. 6d.

# The Medical Journal of Australia

SATURDAY, NOVEMBER 2, 1946.

*All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.*

*References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.*

*Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.*

## THE THERAPEUTIC VALUE OF READING.

Most people convalescent from an illness like to have one or more books at hand into which they may dip as the fancy strikes them. With men and women who are in the habit of reading this is to be expected, but sometimes persons not so accustomed seem to display during convalescence a greater interest in books than can be accounted for by the fact that they have a good deal of spare time on their hands. One of the commonest gifts to a friend recovering from an illness is a parcel of books. This happy and useful habit should be encouraged. With this statement all doctors and many non-medical persons will readily agree—they will consent without hesitation to the contention that reading is good for those who have been ill and also for those who are ill, if they are not too ill. But there are many facets to this subject which on that account is worth a short inquiry. If we consider for a moment reading in general—why we read, what we read, how all should read and some of the effects which our reading may have on us—we may realize that the practical value is greater than most people think and we may even find something that will be helpful to ourselves.

People read books for many reasons. Some read because time hangs heavily on their hands and must in popular language be "killed". For this anything of the superficial, sugary, froth and bubble or tomfoolery kind of book will do. This does not mean that books of this "light" variety should find no place in our libraries. It is rather the healthy man (or woman, as in all probability it more often is) with time to kill on whom we should frown. Society, fortunately for itself, is gradually moving nearer to the desirable state in which every person of suitable age will be engaged in some kind of work, paid or voluntary, by which he or she will be able to justify existence—the time-killers are becoming fewer and fewer. There is another group of people who read that they may have

something to talk about. This is a sound enough reason for reading; but it may be difficult to distinguish these folk from those who read from force of habit, because they like it or because of some thirst for knowledge or ideas that is hard to satisfy. People who can talk intelligently about books are an asset to any gathering, whether it be at the dinner table, by the fireside or at a social club. We need not inquire why they read, but their conversation is more likely to be worth while if they read because they must than merely to acquire facts or to discover plots. The last reason why people read, that we shall mention, is to discover a groundwork on which to base their own thoughts. These form a group that is smaller than any other, and a compelling motive similar to theirs is not always easy to acquire. This brings us to what we read. As pointed out on a previous occasion, Professor Walter Murdoch believes that there are four kinds of books. These books belong to what he calls the literature of escape, the literature of experience, the literature of direction and the literature of revelation. Books of the first class offer escape from the actualities of life—"they open a door for us, through which we slip, in a moment, into another world when our own has grown unbearably drab". Books of the second class enrich life by adding to our own experience the experience of someone else. Here we have books on travel and on history, biographies and autobiographies; included also are great poems and many novels. Books of Murdoch's third group deal with the art of living, and those of his fourth with the meaning of life. In regard to how we should read, only two observations need be made at the moment. If we are immersed in books of the "escape" variety, we should give ourselves wholeheartedly to the book. For example, in a "thriller" we can trace and doubtless admire the framework, the general construction of the work, and we can speculate on the identity of the villain. Or in such a work as "1066 And All That" we should give ourselves without reserve to the wholly admirable fooling of the authors. In books of other kinds we should try to learn the author's purpose and adjust our way of reading to it. Generally speaking we shall read the author and not merely his words. This is another way of saying that we shall allow the author to provoke our thought. If this discussion was solely concerned with books on medicine or the allied sciences, it would be necessary to lay stress on the need for a critical outlook; in general reading this may be modified in many circumstances. Naturally the effect of our reading on us will depend on several factors; prominent among these are the points that have been mentioned—why, what and how we read. To these must be added something about ourselves—what we are and how we fare. At this point it is simple to turn to our theme of the therapeutic value of reading.

As medical practitioners, the readers of this journal are concerned with the cure of illness as it affects the bodies and minds of their patients; they are also concerned with the prevention of any departure from normal health. Reading may be used as a weapon in both fields. As already mentioned, a man may be too ill to concern himself with reading anything. On the other hand, if he can give his mind to the written word of any kind, he may be able by so doing to dismiss from his thoughts his bodily ailment; during convalescence he will surely be able to take up his books. The books that he reads will belong



almost entirely to Professor Murdoch's first group, the literature of escape. Someone has said that nothing is worth reading that does not require an alert mind. The mind of a sick or tired person may not be particularly alert; a receptive mind is not necessarily alert. Alertness implies quickness; a receptive mind may receive impressions and be able to store them, but it may be slow. It is receptivity of mind that matters to an invalid who wishes to read. Chesterton has observed that there is a great deal of difference between the eager man who wants to read a book and the tired man who wants a book to read. Generally an invalid will be able to choose the kind of book that he wants to read; sometimes his medical attendant or other friend may help in the choice. When this happens, common sense must be shown lest something too complex or subjectively unsuitable be recommended. Incidentally it may be remarked that if the patient is a student and lover of books while he is in rude health, the succession of books that he chooses during recovery from an illness will most likely be an index of his progress towards health—his bodily progress will be reflected in his quickening mind and books of the escape variety will become fewer as time passes. Reading has been mentioned on the preventive side; it is one aspect that has received little attention in the practice of medicine. There can be no doubt that what exercise is to the body reading is to the mind—it keeps the mind alert, oiled as it were, and supple. This is why systematic reading is of such value, and here is something of which the busy practitioner of medicine should never lose sight. No man is so busy that he cannot spare a few minutes every day for some general reading. Even if so ridiculously short a time as fifteen minutes is allowed every day, it is surprising what can be accomplished in a few weeks if the time is given regularly. There is a world of difference between reading systematically and reading as a task. Even reading as a task soon loses its element of compulsion if the material to be read is interesting. Systematic reading means reading on some kind of a programme; it means that works of different kinds will be included—works belonging even to all four of Professor Murdoch's literary group. Those who are in the habit of reading books of many kinds find that every now and again considerable benefit follows the careful reading of a book that can be described as "solid", a book in which concentrated effort is needed to grasp the author's meaning. It is like a meal of meat after less solid food has been eaten for some time, or like a period spent in training the body as for an athletic event. Most men and women read according to their inclination, and those who use their brains as they go through life must turn now and again to such philosophical questions as the nature of man and the meaning of life. It would be surprising if they turned completely from books on these subjects. Finally, whatever is read should be read with the whole attention and with enjoyment. Elizabeth Barrett Browning put it well when she wrote:

We get no good  
By being ungenerous, even to a book,  
And calculating profits—so much help  
By so much reading. It is rather when  
We gloriously forget ourselves and plunge  
Soul-forward, headlong, into a book's profound,  
Impassioned for its beauty and salt of truth—  
'Tis then we get the right good from a book.

## Current Comment.

### A CLEAR LIGHT ON THE DIAGNOSIS AND TREATMENT OF VENOUS THROMBOSIS.

THE fruits of the remarkable researches which have been made in Sweden in the last few years in the pathology, diagnosis and treatment of venous thrombosis have not been gathered to any extent in this country up to the present; here, as in many other places, early diagnosis of the disease is still by no means the rule, its treatment is often characterized by indecision, and serious complications and permanent disability and inconvenience, the cause of which may not be realized, very frequently arise from it. An important study of the subject by G. Bauer, of Mariestad in Sweden, has been recently published in England,<sup>1</sup> based on the examination of 100 normal subjects and 150 patients suffering from recent thrombosis in the leg veins and on the treatment of a large number of patients with heparin; this appears to supply many gaps in our knowledge of the disease and to offer a much better outlook for sufferers from it, based upon rational treatment.

This author has emphasized the now well-known fact, adduced by R. Frykholm in 1940, that thrombosis usually starts in the veins of the muscles of the leg and not in the femoral or iliac veins, as was generally believed on the authority of Virchow and Aschoff. He states that the thrombus formed in the muscle vein soon projects into the lumen of a larger vein and may be gradually built up into a long eel-like structure with a slippery surface, waving in the blood stream. The wall of the vein is not yet involved and the thrombus is anchored only at its lower end. The thrombus may now break and give rise to an embolus; but oftener it grows thicker, blocks the femoral vein, begins to involve the endothelium and becomes firmly attached to the vessel wall along its whole length. White leg now results; but the thrombosis may extend still further, into the iliac veins or still more proximally. At this stage the feverish illness is present and the diagnosis is obvious. After the illness has subsided and the convalescent stage has passed, the patient's troubles may still not be ended; for, once the deep veins of the leg have been occluded by thrombosis, recanalization hardly ever occurs and for the rest of his life the venous blood from the lower part of the leg is returned through an accessory system of subcutaneous veins, usually with the great saphenous vein acting as the chief channel. Thus the superficial veins may become distended and tortuous and their valves defective, and areas of induration due to circulatory stasis may occur in the leg, or actual ulceration may result, which it does in about four-fifths of the patients within ten years.

The most important conclusion drawn from Bauer's study is that if thrombosis is diagnosed early enough it is possible with the aid of heparin to prevent its spread. Early diagnosis is essential, for every hour is valuable. Whenever after surgical operation, childbirth or fracture there is an inexplicable rise in temperature, however small, after the fourth or fifth day, thrombosis should be suspected. Aching or cramp in the calf or an unaccountable restlessness or uneasiness, or a slight pain in the chest (suggesting a small infarction of the lung) should make the suspicion stronger. Palpation of the calf may now elicit tenderness or a firmer consistency of some part of the muscle, and dorsiflexion of the foot may cause pain at the same site. The diagnosis may be made certain by X-ray examination of the veins after the injection of diodone ("Per-Abrodil") into the subcutaneous vein just behind the lateral malleolus. The technique for this, which is very simple, is given in detail by Bauer, and he expresses the opinion that the examination ought to be made without any delay whenever there is the slightest reason to suspect thrombosis. When practitioners encounter such cases in domiciliary practice, it is

<sup>1</sup> *The Lancet*, March 30, 1946.

naturally for them to decide whether heparin treatment should be undertaken in the home on the suspicion of thrombosis or whether the patient should be sent to hospital for phlebography; but Bauer has found that there is no great risk in taking the latter course. The only dangerous course, he asserts, is to do nothing.

Heparin is injected intravenously, as soon as thrombosis is diagnosed, in an amount of 150 milligrammes; thereafter injections of 100 milligrammes are given three or four times a day for a few days, the dose being then gradually diminished. No untoward effects are likely to result from the injections of heparin. Throughout the treatment the patient is allowed to move freely in bed and is made to bend and stretch the legs at intervals during the day. On the day on which the doses of heparin are first decreased he is allowed to get up and even to walk about a little, being provided with an elastic bandage at this time. If the patient is not allowed up, there is a great danger that thrombosis will recur if locomotion is impossible, as in the case of patients who have undergone major operations or sustained fractured legs, the treatment is continued for a longer period. Heparin treatment has been found very beneficial for patients with pulmonary embolism and thrombosis of the retinal veins, and the results of its use in the prophylaxis of thrombosis after surgical operations and childbirth have been very good indeed. It is, however, an expensive drug for prophylactic use.

In the past the basis of the treatment of venous thrombosis in the leg has been fourfold; absolute rest (usually continued for a period of a week or so after the subsidence of pyrexia), elevation of the affected limb, the application of hot poultices to the areas of pain or tenderness and the use of an elastic bandage or stocking as soon as locomotion is permitted. The present indecision as to what is best to be done arises from the fact that every one of these four measures has been the subject of conflict of opinion. Some have advised that the limb should be raised as high as possible; others that the head of the bed be raised for some hours daily so that the crural veins may be filled. The latter sometimes advise that tobacco, being a vaso-constrictor, should be forbidden. Some have objected to rest and advised early locomotion with an elastic bandage. Some have objected to hot poultices and have stated that cold compresses are more comforting and less likely to spread the clot. Various auxiliary methods of treatment have had their advocates. Some have recommended iontophoresis with "Meholyl", which seems a little fanciful. Others have recommended sulphonamide treatment, to which it may be objected that the inflammation is nearly always aseptic. Some have advised prompt ligation of the vein well above the lesion in order to prevent proximal extension of the disease and embolism, but the method may fail in its object and on the other hand may unnecessarily deprive the patient of important veins. The drug dicoumarin has been used, apparently with some success, in prophylaxis, but it is still in the experimental stage and it has been said to cause dangerous by-effects sometimes. It seems that the one clear light on the problem of thrombophlebitis is that which shines out of Sweden and is focused upon phlebography for early diagnosis and the use of heparin for treatment. At present heparin is not generally procurable in this country for the treatment of thrombophlebitis. We can make no advances in our management of this frequently occurring and dangerous disease until we can purchase some from abroad or learn to prepare it locally.

#### THE NEUROCYTOLOGY OF OLD AGE.

SHAKESPEARE in more than one of his dramas has given us terribly realistic and indeed repellent pictures of old age, though against that we have the attractive personality of the servant Adam in *As You Like It*, whose age was like a lusty winter, frosty but kindly. Shakespeare's amazingly acute perceptive faculties naturally did not extend to the microscopic structure of the central nervous system, where indeed the most significant changes are to

be found. Some years ago a distinguished surgeon, more adept in his art than in pathology, proclaimed both in technical and popular publications his belief that the degeneracies which overcome the tissues in advanced life are the result of chronic poisoning from bacterial products elaborated in the bowel. There is more than a hint that the reasoning of this surgeon, thinly disguised in one of Bernard Shaw's plays, furnishes us with what is known in formal logic as the fallacy of the undistributed middle—old age shows increase of fibrous tissue over cellular; chronic poisoning shows increase of fibrous tissue over cellular; therefore old age is a chronic poisoning. Pathologists were not slow to point out that in the central nervous system the conditions found in old age do not in the least resemble those following chronic poisoning. What, then, are the appearances of the central nervous system in old age? C. S. Hodge in 1894 published a description of the nerve cells of a man of ninety-two and compared these cells with those of a child.<sup>1</sup> He found a retraction of the cell wall, a loss of nuclear chromatin in many cells, a disappearance of the nucleolus, also numerous lipid granules in the altered cytoplasm. Hodge also found similar changes in the ganglion cells of bees which had reached their limit of life. A. T. Salimbeny and L. Gery in 1912 described the histological appearance of the cerebrum, cerebellum and spinal grey matter in a woman of eighty-three and in general confirmed the findings of Hodge.<sup>2</sup> W. F. Robertson and D. Orr (1898-1899) examined the cerebrum of a woman who had "died of old age" at ninety, and found degenerative changes with a diminution of Nissl granules in 60% of the pyramidal cells.<sup>3</sup> It may be remarked here that the well-known sensitiveness of the Nissl bodies to fatigue and to anaesthetics would lead us to expect this condition. O. Wilhelm in 1932 carried out interesting investigations on lumbar dorsal ganglia, the cerebellum and other parts of the nervous system in elderly human beings, dogs and rats.<sup>4</sup> He found an increase of pigment in nerve cells, a probable diminution of Purkinje cells and a diminished staining capacity of the chromatin and nucleolus.

Professor Warren Andrew, of the South-Western Medical College, Dallas, Texas, and "Visiting Professor" of the Faculty of Medicine, Montevideo, Uruguay, delivered an address at the Neurological Institute, Montevideo, on the neurocytological bases of senility, a subject in which he has specialized for some time.<sup>5</sup> The address, in the Spanish tongue, has recently been published in the *Anales de la Facultad de Medicina de Montevideo*. Andrew reminds his readers that nerve cells do not reproduce, nor are old cells replaced, by new ones; the nerve cells in a centenarian are precisely those which were laid down in embryonic or early post-embryonic life. In consequence the nerve cell is ideal for the study of the effects of succeeding years. Andrew experimented with a number of mice and rats, the expectation of life being two years and three years respectively. The cerebellar hemispheres, cerebral hemispheres and semilunar ganglia at all ages up to approaching death were examined by the Nissl technique. Excellent photomicrographs illustrate the findings, which may be summarized as follows. Senility in the parts examined was marked by a loss of transparency of the nuclear substance; an alteration of the cytoplasm, characterized by a decided diminution of the Nissl material; an increase in the neuroglia in the cerebral hemispheres; an accumulation of pigment in the motor cells of the medulla and, though to a lesser degree, in the cells of the cerebral cortex and semilunar ganglia, but not in the Purkinje cells. Lastly, the Golgi apparatus of the Purkinje cells had undergone a process of fragmentation, for which the author has coined the descriptive term *golgiorexis*, the English equivalent of which would probably be *Golgiorexis*. Here the examination, which was purely morphological, ends.

<sup>1</sup> *The Journal of Physiology*, Volume XVII, 1894, page 129.

<sup>2</sup> *Annales de l'Institut Pasteur*, Volume XXVI, 1912, page 577.

<sup>3</sup> *The Journal of Mental Science*, Volume XLIV, 1898-1899, page 729.

<sup>4</sup> *Endokrinologie*, Volume X, 1932, page 172.

<sup>5</sup> *Anales de la Facultad de Medicina de Montevideo*, Volume XXXI, 1946, page 87.

## Abstracts from Medical Literature.

### BACTERIOLOGY AND IMMUNOLOGY.

#### The Cultivation of Blood Clot for Brucella.

D. EVELYN WEST AND EARLE K. BORMAN (*The Journal of Infectious Diseases*, November-December, 1945) have investigated the cultivation of blood clots for Brucella organisms. Skin tests and agglutination tests have variable factors, both biological and technical, and it was decided to attempt cultivation of clotted blood sent for the performance of agglutinin tests on the serum. Large jars and smokeless candles were used to produce a low carbon dioxide tension during incubation of the specimens which were macerated aseptically and then transferred to crystal violet tryptose broth, pH 6.9, and left for four to seven days at 37° C. Subcultures were then made onto Kligler's iron agar containing 1% sucrose and incubated for one to three days in carbon dioxide. Brucella does not change Kligler's medium, and agglutination tests can be carried out on the surface growth. Forty-two isolations were made from 4,051 clots tested, forty of the organisms being *Brucella abortus* and two *Brucella suis*. Twelve cultures of *Bacterium typhosum* were isolated. Of the cultures, 16% were from individuals giving negative results to agglutination tests for the corresponding organism.

#### Streptococcus Subacute Bacterial Endocarditis.

LEO LOEWE AND N. PLUMMER, AND C. F. NIVEN AND J. M. SHERMAN (*The Journal of the American Medical Association*, February 2, 1946) have described a streptococcus of special type found in subacute bacterial endocarditis. It produces greening on blood agar, is of single type when tested by the Lancefield technique, ferments inulin but not raffinose, and hydrolyses arginine. It has not been found in the human mouth and throat. Statistics from the 41 patients in whom it has been isolated show that it is extremely resistant to the action of penicillin, and patients were given an uninterrupted span of treatment for eight weeks with daily intravenous administration of two million units of penicillin. Use of the diagnostic antiserum to identify the organism and so to determine the need for massive treatment has been of value to patients.

#### Immunization in Pneumococcal Pneumonia.

C. M. MACLEOD, R. G. HODGES, M. HEIDELBERGER AND W. G. BERNHARD (*The Journal of Experimental Medicine*, December, 1945) have investigated the prevention of pneumococcal pneumonia by immunization with specific polysaccharides. An American Air Force technical training camp which in the previous two winters had had a high incidence of pneumonia was chosen, and the members of the unit were given a single injection. Each alternate man received an injection of phenolized saline solution, while the test subjects received one millilitre of a mixture of polysaccharides of types 1, 2, 5 and 7.

In some instances when the preparations were thought not to be of comparable strength, 1.5 millilitres were given. The numbers of men in the test and control groups respectively were 3,755 and 3,975. During the next seven months, four men in the test groups and 26 in the control group developed pneumonia of one of the four types to which they had been immunized, while cases of pneumonia due to other types numbered 27 in the group tested and 28 in the control group. Observations of the immunized men showed that serum antibodies appeared after nine days, and persisted for the minimum time of observation, six months. Carrier rates of pneumococcal types were assessed during the study, and it was found that 1.79% of the immunized persons and 3.26% of controls carried one of the four test types, while the percentage of other types present was 68 and 71 in each of the two groups. There was also a greatly reduced incidence of pneumonia amongst the non-immunized persons, owing, it was believed, to a general reduction in the carrier rate of pneumococci of all types.

#### Neutralization of Corynebacterium Diphtheriae Toxin with Standard Antitoxin.

K. ZINNEMANN (*The Journal of Pathology and Bacteriology*, January, 1946) has continued his experiments by studying the neutralization of *Corynebacterium diphtheriae* type toxin with standard antitoxin, as measured by skin reactions in guinea-pigs. He determined that the iron content of the medium used to produce the toxin was well above the level thought to be necessary, and disposed it in vessels to give an average depth of one centimetre. Toxin-antitoxin mixtures were allowed to stand for two hours in the dark before injection into the animals to be tested, and similar dilutions of toxins prepared from strains of *gravis*, *mitis* and *intermedius* and the PWS strain were inoculated into the skin of a single animal. Twelve experiments were carried out, and it was found that one minimal reacting dose of each toxin was neutralized by the same amount of antitoxin. Two experiments carried out on white rabbits produced similar results. The author observes that while quantitative differences between strains did not appear to exist when adequate iron was present in the medium in which it had been produced, possibly the suggestion of Orskov that *gravis* strains produce a marked inhibition of phagocytosis might throw new light on the study of clinical cases of severe diphtheria.

#### Complement Fixation in Hepatitis.

J. A. R. MILES (*The British Journal of Experimental Pathology*, February, 1946) has made a serological investigation into hepatitis and has used the complement-fixation test as part of a wide series in an attempt to find some specific test for the diagnosis of infective hepatitis. Antigens were prepared from livers obtained in fatal cases of hepatitis, in acute liver necrosis, and in homologous serum hepatitis, as well as from livers apparently normal. No difference was found in the reactions given to these antigens by a wide series of sera. When the serum came from patients suffering from post-arsphenamine hepatitis, however, a specific

result was obtained, as these sera reacted with antigens prepared from livers of arsphenamine hepatitis and with no others. Sera from patients with all types of hepatitis did give certain reactions with both normal and abnormal antigens, but no specific reaction for hepatitis was found.

#### Portals of Entry of Poliomyelitis.

HAROLD K. FABER AND ROSALIE J. SILVERBERG (*The Journal of Experimental Medicine*, April, 1946) have made a neuropathological study of acute human poliomyelitis with special reference to the initial lesion and to the various potential portals of entry. They made a careful study of material from eight fatal cases and paid particular attention to the first ganglion cell on the path from the periphery to the central nervous system. The olfactory bulb was not involved in any case, but in seven the Gasserian ganglion showed definite lesions and cell damage. In one case the gustatory pathways were involved, and in three the afferent systems of the glossopharyngeal and vagus nerves showed signs. In the study of the sympathetic system, evidence pointing to respiratory and alimentary ganglia as nodes of infection was forthcoming, though in some cases the lesions in associated cord segments were so heavy as to obscure the probable pathways. In general the upper alimentary and respiratory tracts appeared more conspicuously to be the site of virus penetration than the lower alimentary tract. Primary invasion through the sympathetics leads to spinal involvement, invasion through other channels to brain stem involvement, but in neither case is there any indication as to the site of initial paralysis.

#### Coagulase and Haemolysin.

R. E. O. WILLIAMS AND G. J. HARPER (*The British Journal of Experimental Pathology*, April, 1946) have studied the methods of determination of coagulase and a haemolysin produced by staphylococci, and have compared eleven tube methods and the slide method for coagulase, and three methods for the production of a haemolysin. Strains numbering 152 were tested, and 100 were coagulase-positive; three methods in which diluted plasma and a fairly large inoculum were used gave comparable results. Of these 100 strains 93 also produced a haemolysin and two produced  $\beta$  lysin. The use of broth or sloppy agar did not affect the results of the tests for haemolysin production.

#### Streptomycin.

J. FORGACS, G. B. KORNEGAY AND T. F. HENLEY (*The Journal of Laboratory and Clinical Medicine*, May, 1946) have described a method for the assay of streptomycin in body fluids, especially blood and urine. They used a suspension of *Bacillus subtilis* spores as the test organism, and dropped half-inch filter pads onto inoculated plates at equidistant areas; they then delivered the dilutions of fluid to be tested onto the filter paper in duplicate, and known concentrations of streptomycin were included as controls. All estimations were repeated on five different plates. Incubation was carried out at 28° to 30° C. for seventeen hours, that is, overnight. The method was satisfactory and reproducible, and was



adopted by the office of the Surgeon-General, United States Army. The same workers have studied the blood levels after administration of streptomycin by subcutaneous, intravenous, intramuscular and intraperitoneal routes to the mouse, guinea-pig, rabbit and man. Maximum blood levels appeared from fifteen to sixty minutes after injection of a single dose. No effect could be found on the red or white blood cells of animals receiving streptomycin. Variations in blood and urinary levels are found in patients undergoing therapeutic courses of injections similar to those found in animals.

#### HYGIENE.

##### Rheumatic Fever in the Army Air Forces.

CHARLES A. R. CONNOR (*American Journal of Public Health and the Nation's Health*, March, 1946) states that the Army Air Force, like the Navy, experienced in the United States of America during 1945 epidemics of respiratory disease caused by a sulphadiazine-resistant group A type 17 streptococcus. At Utah the trend of acute rheumatic infections followed closely that of the group A streptococcal respiratory disease. The army failed to secure the reduction to one-seventh of rheumatic infections by the use of sulphadiazine reported elsewhere. Similarly intravenous administration of salicylates and penicillin (25,000 units up to 1,000,000 units given every three hours, intramuscularly) failed as prophylaxis. Under massive doses of salicylates given intravenously, severe symptoms, even psychoses, were noted, yet the cardiac signs became worse. Adequate plasma levels are attained by oral dosage. A large number of rheumatic patients developed anxiety states. The absolute bed confinement was held responsible. Rest should be defined as maximum ease and comfort physically, mentally and emotionally. Sitting in and out of bed and the walk to the latrine were allowed with good results and prevention of neuroses. Only heart failure or the presence of painful joints was held to justify complete immobilization. Judicious physical activity is an important part of the therapy of rheumatic fever.

##### Epidemiology of Schistosomiasis in Leyte.

THOMAS B. MAGATH AND DON R. MATHIESON (*The American Journal of Hygiene*, March, 1946) discuss the epidemiology of schistosomiasis in Leyte. The intermediate host, *Schistosomophora (Oncomelania) quadrasi*, is found only in small shade creeks meandering in flat land and arising from small ponds or spreading out in shallow swamps mostly at the water edge, sometimes, too, in shady ditches skirting rice paddies. The snail tends to climb on grass stems. In swift streams with steep banks the snails are not found. About 1% to 5% were infested with *Schistosoma japonicum*. The natives dwell close to water for bathing and washing, while swampy land is invaluable for rice crops. Faeces are deposited anywhere. The heavy rainfall, 100 inches yearly, washes the faeces into the water, especially in the wetter months of

December and January. In the hyper-endemic village of Palo 64% of rats trapped were infected. No privies existed, though the drainage ditch was favoured. Of 505 snails from the ditch 21% carried the cercariae. Of 300 snails in the lake, ten feet or more from the shore, 1-3% carried the cercariae. In remote rice fields, 604 snails contained none. The faeces of pigs and to a less extent dogs are involved; nearly 100% are infested. Cercariae rise to the water surface over the snail, forming an umbrella, and the shallow area near the swamp margin is the usual area of infestation. This may be seasonal near the peak of the wetter season. Children are chiefly affected, boys mainly under five years of age, but both sexes over five; 75% are affected at ten, and infestation is universal by fifteen years of age. Of army personnel a thirty minutes' exposure in a river infested every one of eight exposed. Many acquired the disease by rinsing their bodies in fresh water after a swim in the sea. About 100 cercariae are needed to set up the clinical condition and about 25 worms develop. Splashing into shallow pools or swamps was blamed rather than swimming in a large river.

##### The Estimation of Anopheles Larva Density.

PAUL F. RUSSELL, T. R. RAO AND P. PUTNAM (*American Journal of Hygiene*, November, 1945) have made a statistical study of methods of estimating *Anopheles* larva density carried out during a 33-months survey in the Tanjore district of Madras. With the exception of captures in wells and in burrow pits, the simple ratio of larvae captured to minutes spent in dipping gave a good practical measure of density rather than the area covered. The exact relationship varies with the habitat and also from year to year. *Anopheles culicifacies* showed a more sharply defined seasonal trend than other anophelines. It reached its maximum in wells in July and August and its minimum in May.

##### Scabies in Stenographers.

J. MARKEL (*Occupational Medicine*, April, 1946) describes the occurrence of an outbreak of scabies among fifteen white women working side by side in a statistical department; the women complained of intense itching of two weeks' duration. One of the women had contracted an itchy eruption a few weeks prior to the trouble, after attending a party for a soldier. She did not seek medical aid. Statistical reports were passed from her desk to adjacent desks, and each stenographer handled the pamphlets. The women affected were those working in the central part of the room, where reports were transferred from one desk to another. Investigation ruled out all other methods of contamination and any other cause for the itching. The woman who had attended the party had typical scabies, with burrows in the finger webs and excoriated papulovesicles on the wrists, periaxillary areas, navel, pubes, buttocks and thighs; *Sarcoptes scabiei* was isolated from a burrow. The fourteen other affected women had atypical scabies, with occasional scattered papulovesicles or urticarial weals on the forearms, about the axillary folds or about the nipples. All the women were isolated in their homes and given anti-

scabetic treatment and instructions regarding the disinfection of clothing and bed linen. All responded immediately either to sulphur or to benzyl benzoate. The room, desks and pamphlets were well aerated with cold air and sprayed with a 10% solution of DDT. The outbreak was checked within a week. The author calls attention to the following points: (i) the outbreak was confined to an adjacent group of 15 out of 50 women in the same room and handling the same reports; (ii) the clinical signs were minimal in 14 persons on account of personal cleanliness; (iii) the pruritus was aggravated by increasing the temperature of the room, but persisted at night; (iv) the outbreak was deemed both occupational and compensable.

##### Bacteriological Improvements obtained by the Practice of Break-Point Chlorination.

A. E. GRIFFIN AND N. S. CHAMBERLIN (*American Journal of Public Health and the Nation's Health*, March, 1945) state that free available chlorine kills bacteria in a few seconds and spores within three minutes. All gas-forming bacteria can be eliminated without the impairment of taste and odour by the maintenance of a free available chlorine residual of 0.75 to 1.0 part per million. This is preferred to super-chlorination reduced to low residual of 0.4 part per million by sulphur dioxide. Ammonia may be used to induce a break point.

##### Dental Caries.

J. D. KING (*The Lancet*, May 4, 1946) describes an investigation of the effects on the deciduous teeth of infants living at two institutions of daily supplements of boiled sweets and chocolate biscuits to their diet. The supplements were given at bedtime, after any cleansing of the mouth and teeth. No increase in the activity of dental caries was found in the children over periods of from six months to two years; indeed at the end of the test in some cases previously active caries had become arrested. A dietary survey at one of the institutions revealed a relatively high intake of vitamins A and D and a fairly satisfactory amount of calcium and phosphorus. Carbohydrates formed a large proportion of the diet. The number of children examined was about fifty.

##### Pertussis Vaccine Prepared with Phase I Cultures Grown in Fluid Medium.

SOPHIA M. COHEN AND MARY W. WHEELER (*American Journal of Public Health and the Nation's Health*, April, 1946) report that a medium for *Hæmophilus pertussis* based on Hornbrook's prescription was worked out from over forty combinations. This contains no blood and can be sterilized by heat. The two selected strains were grown for seventy-two hours and the vaccine contains 10,000 million organisms per millilitre, 5,000 million of each strain, and is sterilized by "Merthiolate", 0.01% solution. Tests are carried out for purity for agglutination by phase I serum and for viability of the organisms. For virulence intracerebral injection was used on the mouse. Ninety-three children, 75 less than three years old, were immunized. Three weekly injections of eight millilitres were given without the occurrence of any severe reactions.

## Bibliography of Scientific and Industrial Reports.<sup>1</sup>

### THE RESULTS OF WAR-TIME RESEARCH.

During the war a great deal of research was carried out under the auspices of the Allied Governments. It has been decided to release for general use a large proportion of the results of this research, together with information taken from former enemy countries as a form of reparations. With this end in view, the United States Department of Commerce, through its Publication Board, is making a weekly issue of abstracts of reports in the form of a "Bibliography of Scientific and Industrial Reports". This bibliography is now being received in Australia, and relevant extracts are reproduced hereunder.

Copies of the original reports may be obtained in two ways: (a) Microfilm or photostat copies may be purchased from the United States through the Council for Scientific and Industrial Research Information Service. Those desiring to avail themselves of this service should send the Australian equivalent of the net quoted United States price to the Council for Scientific and Industrial Research Information Service, 425, St. Kilda Road, Melbourne, S.C.2, and quote the PB number, author's name, and the subject of the abstract. All other charges will be borne by the Council for Scientific and Industrial Research. (b) Those marked with an asterisk may be obtained by approved applicants without cost on making application to the Secondary Industries Division of the Ministry of Post-War Reconstruction, Wentworth House, 203, Collins Street, Melbourne, C.I. Copies of these are available for reference in public libraries.

Further information on subjects covered in the reports and kindred subjects may be obtained by approaching the Council for Scientific and Industrial Research Information Service, the Secondary Industries Division of the Ministry of Post-War Reconstruction, or the Munitions Supply Laboratories (Technical Information Section), Maribyrnong, Victoria.

VARIOUS MEDICAL ARTICLES. Off. Pub. Bd., Report, PB 1688. 1939-1945. 1709 pp. Price: Microfilm, \$17.50; Enlargement Print, \$114.00.

54. Noell, W., and Schneider, M.: Über die Wirkung der Kohlensäure auf Blutdruck und Gehirndurchblutung im Sauerstoffmangel. *Luftfahrtmedizin*. 5, 251 (1941), 16 pp.

55. Noell, W.: Über die Wirkung des Theophyllins und der verschiedenen Lösungsvermittler auf die Gehirndurchblutung. *Z. für die gesamte experimentelle Medizin*. 110, 589 (1942), 12 pp.

56. Noell, W., and Schneider, M.: Über die Durchblutung und die Sauerstoffversorgung des Gehirns im akuten Sauerstoffmangel I. Die Gehirndurchblutung. *Pflüger's Archiv für die gesamte Physiologie des Menschen und der Tiere*. 246, 181 (1942), 20 pp.

57. Same authors, same title. II. Der Liquordruck. *Ibidem*, 246, 202 (1942), 6 pp.

58. Same authors, same title. III. Die arterio-venöse Sauerstoff- und Kohlensäuredifferenz. *Ibidem*, 246, 207 (1942), 43 pp. Film of one page is very poor.

59. Same authors, same title. IV. Die Rolle der Kohlensäure. *Ibidem*, 247, 514 (1944), 15 pp.

60. Noell, W.: Same title. V. Einfluss der Blutdrucksenkung. *Ibidem*, 247, 528 (1944), 26 pp.

61. Noell, W.: Same title. VI. Einfluss der Hypoxämie und Anämie. *Ibidem*, 247, 553 (1944), 24 pp.

62. Case histories of army personnel with head injuries. Manuscript (typewritten and script). 28 pp.

63. Beigel, Arnold, Haarstrick, Rudolf, and Palme, Franz: Untersuchung der Hirnkreislaufströme nach Sauerstoffatmung in verschiedenen Höhenlagen. *Luftfahrtmedizin*. 7, 305 (1942), 14 pp.

64. Same authors. Höhenumstellung (Hirnkreislaufströme) nach Unterbrechung der Sauerstoffzufuhr. *Ibidem*, 7, 319 (1942), 16 pp.

65. Dunker, E., and Palme, F.: Die Bedeutung verschiedener Formen willkürlicher Hyperventilation bei normaler und herabgesetzter Sauerstoffspannung in der Einatemungsluft. *Ibidem*, 8, 381 (1943), 24 pp.

66. Optiz, E., and Palme, F.: Darstellung der Höhenanpassung im Gebirge durch Sauerstoffmangel. III. Graduierung der Höhenkrankheit durch das Elektroencephalogramm. *Pflüger's Archiv für die gesamte Physiologie des Menschen und der Tiere*. 248, 330 (1944), 48 pp.

67. Grütering, F., Optiz, E., and Palme F.: Same title. IV. Steigerung der alveolaren Höhenfestigkeit untersucht am Schriftbild. *Ibidem*, 248, 376 (1944), 12 pp.

68. Jahnel, F.: Ueber das Vorkommen positiver Wassermann- und Flockungsreaktionen im Serum anachetend gesunder Hammel. *Z. für Immunitätsforschung*. 98, 306 (1940), 10 pp.

69. Jahnel, F.: Ueber positive Luesreaktionen im Rinderserum. *Ibidem*, 98, 453 (1940), 10 pp.

70. Jahnel F.: Stark positive, nicht auf Syphilis beruhende Luesreaktionen im Blute bei einer bestimmten Erkrankung der Atmungsorgane und ihre praktische Bedeutung. *Klinische Wochenschrift*. 20, 1089 (1941), 12 pp.

71. Jahnel, F.: Ueber positive Luesreaktionen in Blut und Liquor nach Einspritzung von artfremdem Serum. *Münchener medizinische Wochenschrift*, Number 30, 828 (1941), 12 pp.

72. Jahnel, F.: Ueber das Vorkommen positiver Luesreaktionen im Serum von Pferden. *Z. für Immunitätsforschung*. 99, 451 (1941), 8 pp.

73. Jahnel, Franz: Neue Untersuchungen über die Pathologie und Therapie der syphilitischen Erkrankungen des Gehirns und Rückenmarks (Lues cerebros spinalis, Lues cerebri, Lues spinalis, Tabes). *Fortschritte der Neurologie, Psychiatrie und ihrer Grenzgebiete*. 13, 375 (1941), 24 pp.

74. Jahnel, Franz: Die progressive Paralyse und die syphilitischen Geistesstörungen. *Ibidem*, 15, 99 (1943), 32 pp.

75. Jahnel: Forschungsauftrag. Serologische Besonderheiten des Malariaablates. Typewritten manuscript. 1944. 3 pp.

76. Jahnel: Forschungsauftrag. Erforschung der verschiedenen Eigenschaften von Rückfallfieberstämmen zwecks Gewinnung näherer Einsicht in die Genese der Rückfallfiebers und andere Spirochäteninfektionen. *Experimenteller Teil*. Typewritten manuscript. 1944. 3 pp.

Section C. Unpublished reports and sample records of Dr. H. Spatz, Kaiser Wilhelm Institut für Hirnforschung.

77. Spatz, H.: Prinzip der Organisation der Forschungsarbeiten am Kaiser-Wilhelm-Institut für Hirnforschung, Berlin-Buch, während des Krieges. Typewritten manuscript. 1945. 5 pp.

78. Spatz: Pathologische Anatomie der gedeckten und offenen Gehirnverletzungen. Two typewritten manuscripts. 1944. 3 pp. and 15 pp.

79. Spatz, H.: "In Gehirn liegt die Führung." 30. Jahre Kaiser-Wilhelm-Institut für Hirnforschung. Typewritten manuscript. 5 pp.

80. Spatz: Aus dem Gebiete der Gehirnpathologie mit besonderer Berücksichtigung der Luftfahrtmedizinischen Belange. Typewritten manuscript. 1944. 6 pp. Film is poor.

81. Spatz: Von den Zielen des Kaiser-Wilhelm-Institut für Hirnforschung, Berlin-Buch. *Denkschrift an die Generalversammlung der Kaiser-Wilhelm-Gesellschaft*. Typewritten manuscript. 1945. 10 pp.

82. Miscellaneous typewritten and script notes on personnel, organization, case histories of wounded (head wounds), post-mortem reports and photographs et cetera. 79 pp.

VEDDER, E. B., AND ARMSTRONG, G. C. The toxicity of sulphur dioxide. (Chemical Warfare Service. Edgewood Arsenal Technical Report, E.A.T.R. 149.) Off. Pub. Bd., Report, PB 6374. 1933. 65 pp. Price: Microfilm, \$1.00; Photostat, \$5.00.

The object of the work described in this report was to determine the median lethal concentrations of sulphur dioxide on several experimental animals and to study the effects of this gas upon animal life and health when breathed in low concentrations over long periods of time. Appendix "A" consists of an abstract of an article by Robert A. Kehoe, M.D., and others, "On the Effects of Prolonged Exposure to Sulphur Dioxide", from *The Journal of Industrial Hygiene*, Volume XIV, Number 5, May, 1932. Photographs, tables and graphs.

STEVENS, S. S. The effects of noise and vibrations on psychomotor efficiency. (OSRD Report 34.) Off. Pub. Bd., Report, PB 8333. 1941. 18 pp. Price: Microfilm, 50c.; Photostat, \$2.00.

This progress report supplements that of March 31, 1941, in which the experimental apparatus and procedures were described in detail. Data are now available covering the performance of seventeen subjects exposed to aeroplane noise at an intensity of about 116 decibels. Contrary to the

<sup>1</sup> Supplied by the Information Service of the Council for Scientific and Industrial Research.

indications of the preliminary tests, it is now apparent that noise does not facilitate performance on any of our tasks. On the other hand, there are definite indications that coordinated serial reaction time and eye-hand coordination are impaired by three-hour periods of exposure to noise. Although noise impairs the performance of some individuals, the results of some of our other tests are ambiguous. Experiments are now in progress involving five subjects who are being subjected daily to aeroplane noise for eight-hour periods. Two intensity levels (90 and 116 decibels) are being used.

WALTON, D. C. The effect of sulphhydryl compounds on tadpoles poisoned with  $\text{CH}_3\text{AsO}$  and with  $\text{HCN}$ . (Chemical Warfare Service. Edgewood Arsenal Technical Report, E.A.T.R. 43.) Off. Pub. Bd., Report, PB 6261. 1931. 18 pp. Price: Microfilm, 50c.; Photostat, \$2.00.

The object of the experiments reported was to determine if tadpoles are a suitable organism for the preliminary testing of therapeutic measures by (i) a study of the effect of sulphhydryl compounds on tadpoles poisoned with  $\text{CH}_3\text{AsO}$  and with  $\text{HCN}$ , and (ii) a comparison of the results of these experiments with those obtained by Voegtlin in animal experiments. It was concluded that (i) the results of experimental work upon tadpoles were not always comparable to those of similar work upon mammals, and (ii) work upon tadpoles is expensive and just as difficult to control as work upon mammals, and, when completed, the figures are on tadpoles and cannot be transferred to mammals.

WEXLER, JACK, AND RASMUSSEN, LOTON H. Evaluation of local treatment of mustard burns. (Chemical Warfare Service. Medical Research Laboratory MRL (EA) Report 36.) Off. Pub. Bd., Report, PB 9561. 1944. 15 pp. Price: Microfilm, 50c.; Photostat, \$1.00.

Tests made to evaluate some of the therapeutic agents recommended for the local treatment of ulcers resulting from burns produced by liquid mustard indicated that petrolatum with 1% to 3% silver nitrate led to more rapid healing than sodium sulphadiazine ointment, but sulphadiazine ointment led to more rapid healing than plain petrolatum. Sulphathiazole ointment in a petrolatum-lanolin base led to slightly more rapid healing than sulphadiazine ointment. Repeated applications of sulphonamides for six weeks or more delayed healing, and vaccination shields used to protect the lesions were unsatisfactory. Tables are included.

SHELDON, H. D., AND McDONALD, GEORGE C. Interrogation report concerning studies on effect of high wind velocity on human subjects. (Army Air Forces. Technical Intelligence Report 1-34.) Off. Pub. Bd., Report, PB 7816. 1945. 1 p. Price: Microfilm, 50c.; Photostat, \$1.00.

The basic report was prepared by W. R. Lovelace and V. J. Wulff. Dr. Ing. Adolf Busemann and Dr. Ing. Wilhelm Knackstedt were interviewed at *Luftfahrtforschungsanstalt*. To the knowledge of these two men, no work had been carried out at LFA on the human parachute opening shock, on ejection of pilots from high-speed aircraft, on design of the seat, or on pressure cabins and related controls. Tests and experiments conducted are described.

VIGLIANI, ENRICO C., AND PRADELLI, ENZO. *La prevenzione della silicosi nelle industrie metallurgiche e meccaniche*. (The prevention of silicosis in the metallurgical and mechanical industries.) Milan, Società Anonima Antonio Cordani, 1944. 166 pp. Off. Pub. Bd., Report, PB 5534. Price: Microfilm, \$1.00; Photostat, \$7.00.

Subjects covered are: medical notes on silicosis and other pneumokoniosis diseases; measurement of the dust content of the air in metallurgical and mechanical plants; preventive measures against silicosis in metallurgical and mechanical industries; prevention of silicosis in the different metallurgical operations.

PB 16784. LUTZ, HABIL W. Summarizing report covering scientific activity. No date. 21 pp. Price: Microfilm, 50c.; Photostat, \$2.00.

This report consists of a short personal history of Dr. H. W. Lutz, who was associated with the Institution for Aviation Medicine at the University of Munich; a bibliography of the subject's scientific work not connected with military medicine; brief summaries of his research on the physiology of altitude and on extreme cooling, and of an industrial constructive and miscellaneous nature. This latter group included: (i) a decompression suit for aviators in pressure cabins (German patent L 105392 V/61a, November 13, 1944); (ii) collecting apparatus for expired air in U-chambers (German patent 761 911, October 10, 1942). Among his finished works are: "On Evaluation of Oral Cholecystography"; "Survival Time after Decompression to the Highest Altitude"; "On the Nature and Cause of Stopping of the Heart upon Extreme Cooling"; "Control of Parachute Jumping by Flowmeter"; "General Directions

for Behaviour in Case of Electrical Accidents (Apparent Death)", by Lutz and Merz. Experiments and manuscript are finished covering his work "On the Reversibility of Death by Cold", but it still lacks figures and tables. A page in German from the subject's manuscript on "Animal Experiments Preparatory to Parachute Jumps from Pressure Cabins" is attached, but no other attachments or appendices are included.

PB 18392. *Mitteilungen des Reichsforschungsrates: Medizin Jahrgang, 1944-1945. Heft Nr. 1.* (ALSOS Mission, RFR 714.) December, 1944. 43 pp. Price: Microfilm, 50c.; Photostat, \$3.00.

This publication was issued to acquaint Germans with scientific advances in foreign countries, in the fields of medicine, chemistry, physics and mathematics. This number deals with several phases of medicine in the United States, England and other parts of the world. Brief review articles include work on the electron microscope, blood plasma and blood substitutes, extraction, purification and use of penicillin, local treatment of wounds, and the therapeutic effects of the diamidines for the protozoan infections of humans and house pets.

PB 18634. UNITED STATES ARMY TECHNICAL INTELLIGENCE CENTRE, TOKYO. Japanese medical equipment: hospital, field. (Report 165.) January, 1946. 13 pp. Price: Microfilm, 50c.; Photostat, \$1.00.

This hospital unit would correspond nearly to the collecting company of our medical battalion. The equipment is poor, is not compact and cannot be handled easily. It is probable that no definitive treatment could be furnished by this unit other than *débridement* and temporary splinting prior to evacuation of the wounded. The lack of material for the treatment of shock is striking. This unit is made for vehicle transportation. It is considered to be of no intelligence value other than to compare with the corresponding United States Army Medical Unit. An inventory list of each chart accompanies this report and two photographs are included.

PB 18635. UNITED STATES ARMY TECHNICAL INTELLIGENCE CENTRE, TOKYO. Japanese medical equipment: tourniquets, Japanese, four types. (Report 176.) January, 1946. 3 pp. Price: Microfilm, 50c.; Photostat, \$1.00.

Four types of Japanese tourniquets are described, two of which can be operated with one hand by the wounded individual. Type 2 and type 3 are of no importance and could not be operated with one hand by a wounded person. Included in the kit is a piece of red cloth two inches by six inches with a half-inch wide white stripe down both sides. It is used to identify those individuals who must have their tourniquets released periodically. A photograph of the kit is attached to the report.

ROSE, EUGENE, AND HADBURG, DAVID. Japanese individual protective pouch. (F.M.T.R. 100.) Off. Pub. Bd., Report, PB 4505. 1945. 7 pp. Price: Microfilm, 50c.; Photostat, \$1.00.

An olive-green, rubberized pouch, two and a half inches by five and a quarter inches, containing a viscous liquid (chiefly ethylene glycol) is described and illustrated by photographs. Analysis of the liquid is given. The liquid would serve as a soothing agent against body irritation (inflamed or abraded tissue), but has negligible antiseptic effects.

UNITED STATES ARMY FORCES, PACIFIC. CHIEF SURGEON. Final report of the Committee for the Technical and Scientific Investigation of Japanese Activities in Medical Sciences. Off. Pub. Bd., Report, PB 13804. 1945. 188 pp. Price: Microfilm, \$2.00; Photostat, \$13.00.

The purpose of the Special Committee was to examine and evaluate Japanese medical installations and personalities which could be useful during the occupation period, to correlate the activities of the enemy equipment intelligence, and to engage in the investigation of such phases of Japanese medical activities as directed by the chief surgeon. During three months preceding the conclusion of the above report every Japanese city of importance in medical research and education and every first-class medical institution was visited, the administrators and professors were interrogated, and reprints and manuscripts were secured to supplement this information. Thus, a complete screening of Japanese medicine for new developments and methods was accomplished. However, the vast amount of literature and information concerning all sorts of medical activities over a period of twenty years became so voluminous that the committee became a "screening" rather than an "investigating" agency. Nevertheless, many new developments, unfamiliar procedures and interesting theories were found, contained mainly in the literature published after 1940. An account of all this work will be found in the present report, which at the same time is the most complete and concise medical and scientific directory of Japan of recent date in the English language.



## British Medical Association News.

### NOTICE.

THE General Secretary of the Federal Council of the British Medical Association in Australia has announced that the following medical practitioners have been released from full-time duty with His Majesty's Forces and have resumed civil practice as from the dates mentioned:

Dr. E. Murray Will, "Wyoming", 175, Macquarie Street, Sydney.

Dr. E. W. Sibley, 26, College Street, Sydney (October 14, 1946).

## Medical Societies.

### MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on June 12, 1946, at the Children's Hospital, Melbourne, Dr. A. P. DERHAM, the President, in the chair.

#### Mediastinal Tumour.

DR. RUSSELL HOWARD showed a male infant, aged ten months, whose mother sought advice because of curvature of the baby's spine first noticed soon after birth. X-ray examination revealed thoraco-lumbar scoliosis with convexity to the left, and a previously unsuspected mass in the anterior and upper portion of the mediastinum. A diagnosis of mediastinal sarcoma was made and the baby was given a course of deep X-ray therapy. Films taken at periodic intervals revealed progressive diminution in size of the tumour until the last radiological appearance was normal. The child showed no untoward effects from treatment except slight radiation erythema at the conclusion of the course. Blood examination had given normal results throughout. The diagnosis was considered to be mediastinal sarcoma of thymic or lymph-glandular origin. The extreme radio-sensitivity of the tumour supported this conclusion. The scoliosis appeared to be unconnected with the tumour.

DR. ROBERT SOUTHEY said that he was interested in this case, and had followed in the out-patient department a case which was almost a replica. The mother had the impression that the baby was growing bigger on one side. This was indeed true, and was attributable to scoliosis. The scoliosis was verified by radiological examination, and again a mediastinal swelling was accidentally discovered, though there had been no symptoms of such a mass. The radiologist suggested a malignant tumour or a dermoid cyst as a possible explanation for the mass. Subsequently a series of X-ray pictures were taken. The child remained symptomless and afebrile. Over twelve months the swelling retrogressed slowly, until the last X-ray appearances were pronounced normal. The only difference from Dr. Howard's case was that no deep X-ray therapy had been given.

DR. H. BOYD GRAHAM said that somebody was sure to remark that the tumour was an enlarged thymus, and indeed this was the probable diagnosis. The deviation of the trachea and the rapid response to X-ray therapy were in favour of this diagnosis, the scoliosis being merely coincidental. The X-ray film showed no lack of uniformity in the shape of the bodies of the vertebrae. Dr. Graham did not wish to discuss the cause of the scoliosis, but he thought the deformity should be amenable to correction.

DR. GUY SPRINGTHORPE said that he was puzzled by the absence of stridor and respiratory distress if the thymus was the site of the tumour. Even smaller tumours than this were accompanied by such a syndrome. The whole entity of thymic asthma was controversial.

DR. ERIC PRICE said that he preferred to discuss the scoliosis. Quite a few patients with a similar condition had been observed in infancy, the youngest being aged four months. The difficulty was to devise means of control of the scoliosis at this age. Dr. Price had used a hammock splint with some success. The baby rested on material stretched between two parallel bars. He hoped that Dr. Howard would make use of such a contrivance in this case. Good results had been obtained with the splint, but Dr. Price had a feeling that even without treatment the remaining deformity would not have been very great.

Dr. Howard, in reply, said that he thought the mass was a thymic tumour. The scoliosis had remained untreated until the sensitivity of the tumour to X rays had been demonstrated. As Dr. Price had spoken well of the hammock splint, he proposed to put it to the test. Lymphosarcomata were radio-resistant, and recurrence was likely if this was the diagnosis. Dr. Webster had reported cases in which irradiation of lymphosarcomata had led to the appearance of immature white cells of the lymphoid series in the peripheral blood stream and death from lymphatic leucæmia. However, the child had surmounted the first obstacle, and he proposed to treat the scoliosis and hope for the best. It had been observed that the trachea was deviated towards the side of the mass. The scoliosis might be responsible for this apparent anomaly.

#### Spontaneous Pneumothorax.

DR. HOWARD'S second patient was a female infant, aged thirteen months, in whom spontaneous pneumothorax had occurred as a complication of whooping-cough. The child was first admitted to hospital with pertussis and bronchopneumonia. The latter had cleared up slowly with appropriate treatment, but the spasms of pertussis persisted. Nine days after the onset, an X-ray examination revealed what was considered to be a partial right-sided pneumothorax. A second X-ray film taken twenty-seven days after the onset showed that the right hemithorax was almost completely occupied by air, and the mediastinum was greatly displaced to the left. However, a third series of films taken eight days later threw some doubt on the diagnosis of pneumothorax, as what appeared to be trabeculae could be seen crossing the cavity. This suggested that the diagnosis might be congenital cystic disease of the lung. As the child was showing evidence of distress, a needle was introduced into the cavity. Air escaped with a loud hissing sound, and the child's condition improved immediately. A further film eight days later was even more suggestive of a pulmonary cyst, but films taken twenty days later still showed considerable lung reexpansion, and a bronchogram made three months after the onset showed complete reexpansion of the right lung and no evidence of cyst formation.

DR. KEITH HALLAM said that the case illustrated a moral, that one could be misled into surgical thinking by an X-ray diagnosis. The diagnosis appeared to be in doubt. At one stage the condition was almost certainly a pneumothorax. Some fluid had collected at the base of the right lung. In recumbency this might drift up, become inspissated and form strips of thickened membrane, and so give the fine linear tracings seen at the lung base in some of the films. This would give the loculated appearance of a cyst. However, it was not at all certain that the condition was not a lung cyst, and it would be informative if a bronchoscopic examination was made to observe whether there was an occluded bronchus to the middle lobe of the right lung. The bronchogram taken did not elucidate this point. It was difficult to understand why the child should have a spontaneous pneumothorax of this degree.

DR. ROBERT SOUTHEY said that the case raised the point whether children suffering from severe pertussis might develop localized areas of emphysema. He remembered the case two or three years earlier of a child who had cystic swellings remaining in the left side of the chest after whooping-cough. Dr. Colin Macdonald had come to the conclusion that they were localized areas of emphysema. The case under discussion had probably started with emphysema, which ruptured into the pleura to produce a pneumothorax, or possibly this complication had been precipitated by *paracentesis thoracis*.

DR. MOSTYN POWELL said that it was possible for an emphysematous bleb to rupture into the subpleural tissues and increase in size to great proportion by means of a valve-like opening which allowed the entrance of air but hindered its exit. One lateral view of the lung showed a curvaceous lower border, unlike the appearance in true pneumothorax and more suggestive of compressed lung tissue.

Dr. Howard, in reply, said that the diagnosis remained in doubt only because a plain X-ray film was not available at the time the bronchogram was made. However, there was no suggestion of cavitation in the bronchogram. If this was borne out in a straight film, it could safely be said that the condition was not a lung cyst, as this never subsided. Dr. Howard did not think a bulla in pertussis could blow up to such a size as this, but if bullæ did do so, bulla was the likely diagnosis. Otherwise the condition appeared to be a post-pertussis pneumothorax from rupture of an emphysematous bulla.

(To be continued.)

## Naval, Military and Air Force.

### APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 191, of October 10, 1946.

#### PERMANENT NAVAL FORCES OF THE COMMONWEALTH (SEA-GOING FORCES).

**Ante-Dating Seniority.**—The seniority of Thomas Bowen Ready in the rank of Surgeon Lieutenant is ante-dated to 25th August, 1945.

#### ROYAL AUSTRALIAN AIR FORCE.

##### *Citizen Air Force: Medical Branch.*

Temporary Squadron Leader F. J. B. Drake (252835) is called up from the Reserve to the Active List for part-time duties with effect from 2nd September, 1946.

The following Flight Lieutenants are called up from the Reserve to the Active List for full-time duties with effect from 6th August, 1944: W. P. McDonogh (267694), G. S. Stable (277461), 6th February, 1945.

The probationary appointments of the following Flight Lieutenants are confirmed with effect from the dates indicated: W. P. McDonogh (267694), 6th February, 1945, and G. S. Stable (277461), 6th February, 1945.

The appointments of the following officers are terminated on demobilization with effect from the dates indicated: (Temporary Flight Lieutenants) D. Gordon (276870), 12th August, 1946, H. G. Norton (266732), 14th August, 1946, J. H. Isles (273437), P. Vales (277436), 16th August, 1946, A. P. Roberts (266395), J. Segal (267406), G. Whyte (267598), 20th August, 1946, (Flight Lieutenants) Acting Squadron Leaders F. W. Kiel (253233), 26th August, 1946, V. W. Threlkeld (256829), 30th August, 1946, Flight Lieutenant J. D. Connellan (256866), 29th August, 1946.

The appointments of the following Temporary Flight Lieutenants are terminated on demobilization with effect from the dates indicated: C. R. Wherrett (267599), 22nd August, 1946, J. K. L. Marks (277392), 2nd September, 1946, R. C. Opie (263435), P. A. Tod (277138), C. I. Wilkinson (277479), 3rd September, 1946.

##### *Reserve: Medical Branch.*

Francis James Bain Drake (252835) is appointed to a commission with the temporary rank of Squadron Leader with effect from the 2nd September, 1946.—(Ex. Min. No. 240—Approved 2nd October, 1946.)

## Correspondence.

### THE BASIS OF POST-OPERATIVE TREATMENT IN APPENDICITIS AND PERITONITIS.

SIR: My recent article on "The Basis of Post-Operative Treatment in Appendicitis and Peritonitis" has brought me inquiries and much interesting discussion with my colleagues. It appears that I have failed to make clear at least two points and I would be glad of the opportunity of rectifying this.

Several have inquired whether the described method is advised for use after abdominal operations other than appendectomy. The method is advised for all cases in which bowel has been handled, or exposed or packed off, and thus unavoidably traumatized. In cholecystectomy the transverse colon is thus affected, and in pelvic operations, the ileum; and in hernia operations, the bowel when adherent or incarcerated in the sac. One surgeon described how he had just lost a patient from "paralytic ileus" after hysterectomy. The bowels had not acted in the first day or two, so he plied her with aperients *et cetera*, and she became progressively more distended and died, in spite of all modern "help". He secured a post-mortem examination and found the terminal loop of the small intestine collapsed and flaccid, but the upper loops were grossly distended and filled with fluid. They had given little sound on auscultation because they were filled with fluid, not with gas and fluid. It is probable that if the intestines had been let alone the upper coils could easily have reabsorbed most of the bile and pancreatic juice, and what little *succus entericus* is secreted

when no food is taken. But the aperients converted the absorbing surface of the small intestine into a turbulent secreting surface. The terminal loop of ileum could deal with a quiet trickle, but not with a turbulent flood. The potential intestinal obstruction was converted into an actual obstruction.

Another point raised by several of my friends and by the author of "Current Comment" in the current issue of the journal is that the method laid down is rather rigid, whereas the metabolic requirement of patients is variable. To this I would reply that it is not practicable to devise a method which would supply the exact requirements of each individual patient, just as it was not practicable for Sippy to describe such an elastic method when he laid the foundations of the present-day dietetic treatment of peptic ulcer. It would be possible to add a few drachms of water for one patient and a pinch or two of glucose for another, and to take a little away for a third. But such fussing, besides being impracticable for the busy surgeon, is quite unnecessary. None of the patients reach their full caloric requirements in the first five days. But even if the starvation were absolute and the glucose and bread and butter were not allowed, the patient would come to no harm. At this point let me quote in more detail the experience of A. J. Carlson, Professor of Physiology at Harvard, and his assistant. They fasted for five days, taking nothing but water, and at the same time attended to their daily work. At the end of the period they felt somewhat weak, less so when lying down. Defecation did not take place and the secretion of urine was diminished. There was some mental depression during the fasting, which disappeared during the first meal after the fasting period, and which was therefore thought to be of nervous origin. After the fasting period, "from the second day on, both men felt unusually well, distinctly better, in fact, than before the hunger period, although both men are normally in good health and vigour and not hampered by excessive fat. The writer (A.J.C.) felt as if he had had a month's vacation in the mountains. The mind was unusually clear and a greater amount of mental and physical work was accomplished without fatigue. . . . Civilized man has travelled far from the conditions of life among wild animals and primitive man, with whom periods of enforced starvation are not uncommon. Occasional periods of starvation, say once or twice a year, in the case of healthy adult persons may not only add to the joy of living, but also to the length of life". The patient at rest in bed should not fare badly therefore on water and glucose, and further foods on the fourth day. In the more severe case the "alimentary rest" is a little more prolonged. But when the patient is progressing well, as they almost always do, their appetite returns after a day or more, and they feel hungry! But this is to be taken as a good sign of satisfactory progress, not as a criticism of the method. It is difficult to achieve worthwhile "alimentary rest" without some hunger. But it is possible for both surgeon and patient to exercise the higher intellectual faculties, by which they may discipline the appetite and ignore the hunger, if it is in a good cause. What a small matter is a few days of hunger compared with the over-riding threat of peritonitis or induced intestinal obstruction! In surgery, as in all human activity, evil comes when principles are made to wait on appetite.

Yours, etc.,

V. J. KINSELLA.

235, Macquarie Street,  
Sydney,  
October 12, 1946.

### PAIN IN AN AMPUTATION STUMP ASSOCIATED WITH SPINAL ANÆSTHESIA.<sup>1</sup>

SIR: The following case seems to me to be of sufficient interest to warrant publication.

E.G.M., aged fifty-one years, married, a railway clerk, had most of his right leg amputated in March, 1917, in France for a gunshot wound, two days after being wounded. The stump was healed in three months. He has been wearing an artificial limb since December, 1917. He had painful nerve bulbs removed on five occasions up to 1935. He occasionally gets attacks of pain in the stump at about yearly intervals, chiefly at night, and lasting for four to ten hours. He has had relief from heat and aspirin. His prosthesis is an end-bearing one, on a three-inch tibial stump, and he can walk four to five miles in comfort.

<sup>1</sup>Dr. Brooke Moore's letter was published in the issue of October 19, 1946. It appeared, however, with an unfortunate printing error. The letter is therefore published again. Our apologies are offered to Dr. Moore.

He came to me in May this year, complaining of a right inguinal hernia of recent origin. Inguinal herniorrhaphy was performed on May 21. Premedication with a hypodermic injection of one-quarter of a grain of morphine and one one-hundredth of a grain of hyoscine was used. Spinal anaesthesia was induced with 1.8 millilitres of hyperbaric "Percaine" solution; half a grain of ephedrine was given subcutaneously. There was no difficulty in giving the spinal injection.

As soon as the anaesthetic took effect, the patient began to experience severe pain in the amputation stump. It was so severe that he cried out in agony and was not relieved by another quarter of a grain of morphine. He described the pain afterwards as being as though someone was kicking the nerve endings. The pain did not abate till the anaesthetic wore off, when it went entirely. The herniorrhaphy was entirely painless.

This is a factual account and I leave the explanation to others.

Yours, etc.,

BROOKE MOORE.

Undated.

#### LUMBAGO.

SIR: With reference to his article on lumbago in the journal of October 5, page 485, I shall be obliged if Dr. Young will be good enough to explain how the diskogenic theory can be satisfactorily invoked to account for the case described below, provided that the term "disk" be not misconstrued to connote ligaments as well, and that no arbitrary distinction be drawn between "low" back pain and similar pain in the back elsewhere.

I am over fifty years of age and of a rheumatic family. For the last ten years or so I have had annually recurring attacks of "fibrositis" at the commencement of each cold weather.

The location of each attack differs from year to year. On one occasion it occurred in a shoulder girdle, on another at the angle of a scapula, on another in the lumbar region. The last attack (1946) appeared to be in the ilio-sacral articulations or their ligaments. The neck has never been affected. The attacks are generally unilateral and stiffness is absent. In nearly every instance the pain appeared to be in the muscles, and though severe, was always promptly abolished by inductothermy.

Yours, etc.,

"FIBROSITIS."

October 7, 1946.

#### AN INCREASE IN SYPHILITIC INFECTIONS.

SIR: Since May this year an increase in the number of primary syphilitic infections has been noticeable at the clinic for males conducted by the Department of Public Health in the Division of Social Hygiene. From January to April, inclusive, 103 syphilitics came for treatment, and of these 36 (34.9%) were primary infections. Between May 1 and September 30 a further 175 syphilitics came under treatment, and of these 105 (60%) were primary infections.

The percentage of primary syphilis is unusually high and a matter for some concern, as very few of those infected can give any information likely to be of assistance in tracing the source of infection. Notifications of syphilitic infections received from all sources in New South Wales (services included) for the first nine months of this year total 736, and of these 376 (51.1%) were primary infections.

While recognizing that the incidence of syphilis in New South Wales is still low, it is thought that the increased percentage of new infections should be brought under notice so that medical practitioners may be aware of conditions.

Yours, etc.,

E. SYDNEY MORRIS,  
Director-General of Public Health.

Winchcombe House,  
52, Bridge Street,  
Sydney.

October 16, 1946.

#### SOME PROBLEMS OF BACKACHE AND SCIATICA.

SIR: Dr. Young has corrected me on the structure of the intervertebral disk; but that the disk itself is a structure sensitive to pain is not yet proven, nor is proof claimed by any of the authors in the three articles to which he refers

in his letter (THE MEDICAL JOURNAL OF AUSTRALIA, September 21, 1946). Roope observed the presence of some non-medullated nerve fibres in the *annulus fibrosus* and posterior common ligament; some of these fibres were in relation to blood vessels, others were independent of vessels. Kerns et alii merely mentioned Roope's observation, and state that they were "probably pain fibres", but make no claim to proof. Josey and Murphy record seven cases of cervical disk disease which simulated the condition of *angina pectoris*. And in one case, one case only, they observed that pressure upon the back of the disk produced the precordial pain of angina. They did not attempt any dogmatic interpretation of this observation. Dr. Young has taken me to task for the use of the expression "wishful thinking". And yet, in this instance, he appears to have read into the articles quoted considerably more than the authors themselves have claimed. And that seems to me to be an example of wishful thinking.

With regard to the late W. E. Dandy, most will agree that he developed a standard of neurosurgical technique which has not been surpassed. But his opinions and judgement were not by any means invariably accepted by his American colleagues; the passage of time may prove that his colleagues were sometimes right.

In the matter of poetic quotation, I have to admit that Dr. Young has outwitted me. But may not his choice of quotation, by its last line, be regarded as another example of wishful thinking?

Yours, etc.,

LEONARD LINDON.

Verco Building,  
178, North Terrace,  
Adelaide.  
October, 1946.

### Post-Graduate Work.

#### THE MELBOURNE PERMANENT POST-GRADUATE COMMITTEE.

##### COURSE FOR DIPLOMA OF OPHTHALMOLOGY, PART II.

THE Melbourne Permanent Post-Graduate Committee announces that the following course suitable for candidates for the diploma of ophthalmology examination, Part II, has been arranged to commence on November 6, 1946:

*Glaucoma, Injuries and Sympathetic Ophthalmia.*—Three classes by Dr. A. Anderson on Mondays at 4.30 o'clock p.m.

*Operative Surgery.*—Three classes by Dr. J. O'Brien on Tuesdays at 4.30 o'clock p.m.

*Clinical Pathology.*—Six classes by Dr. K. O'Day on Wednesdays at 2 o'clock p.m.

*Neuro-Ophthalmology.*—Four classes by Dr. E. Graeme Robertson on Wednesdays at 5 o'clock p.m.

*Fundus Cases.*—Two demonstrations by Dr. A. Joyce on Thursdays at 4.30 o'clock p.m. in December. Two demonstrations by Dr. G. Brew on Thursdays at 4 o'clock p.m. in November.

All these classes will be held at the Eye and Ear Hospital, East Melbourne, with the exception of Dr. Brew's demonstrations, which will be given at Saint Vincent's Hospital. The course outlined above will be completed by December 12. If necessary, Dr. F. Fenton will give lectures on orthoptics in addition.

The fee for this course is twenty guineas. Applications from those who wish to attend should be sent to the Post-Graduate Committee, College of Surgeons, Spring Street, Melbourne (JM 1547), as soon as possible. Those entitled to financial assistance under the part-time Commonwealth Rehabilitation Training Scheme are requested to indicate this fact on their application.

#### THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

##### ANNUAL GENERAL COURSE.

THE Post-Graduate Committee in Medicine in the University of Sydney makes the following announcements.

*Film Programme.*—The following films will be shown in the Stawell Hall, 145, Macquarie Street, Sydney, at 4.30 o'clock p.m. on Wednesday, November 20, 1946: "Oxygen



Therapy Procedures", "Surgery of the Biliary Tract". No film programmes will be held during the months of December and January.

**Lecture.**—Dr. George Halliday will give a lecture on "Testing for Deafness, with Special Reference to the Penetration Operation", on Wednesday, December 4, 1946, in the Stawell Hall at 4.45 o'clock p.m.

The above programmes form part of the annual general course conducted by the committee, the yearly subscription to which is £1 1s. Members of this course are entitled to receive *The Post-Graduate Bulletin* at a fee of 10s. 6d. per annum. Full details are obtainable from the course secretary at 131, Macquarie Street, Sydney. Telephones: HW 7483-B 4606.

## Australian Medical Board Proceedings.

### NEW SOUTH WALES.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Practitioners Act*, 1938-1939, of New South Wales, as duly qualified medical practitioners:

Green, Zelda Esther, M.B., B.S., 1944 (Univ. Melbourne), Flat 29, Onslow Gardens, Greenknowe Avenue, Potts Point.

Smith, Mervyn Hamilton, M.B., B.S., 1941 (Univ. Melbourne), 60, South Street, Granville.

Walsh, Thomas Joseph, M.B., B.S., 1945 (Univ. Melbourne), Carlton Hotel, Sydney.

Widmer, Blair, M.B., B.S., 1939 (Univ. Melbourne), Belmore Street, Junee.

The undermentioned additional qualifications have been registered:

Johnson, Adrian Mackey, 185, Macquarie Street, Sydney (M.B., B.S., 1939, Univ. Sydney), Dip.Rad., 1946, Univ. Sydney.

Irvine, Allan Francis, 150, Ernest Street, North Sydney (M.B., 1943, Univ. Sydney), B.S., 1944, Univ. Sydney.

### QUEENSLAND.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Acts*, 1939 to 1940, of Queensland, as duly qualified medical practitioners:

Arnot, Eleanor Hattie, M.B., B.S., 1942 (Univ. Sydney), Mundubbera, Queensland.

MacMillan, Kenneth Charles, M.B., B.S., 1945 (Univ. Sydney), Moore Street, Durrbanbandi, Queensland.

Andersen, Neville Arthur, M.B., B.S., 1945 (Univ. Sydney), Base Hospital, Cloncurry, Queensland.

Best, John William, M.B., B.S., 1939 (Univ. Sydney), 57, Guy Street, Warwick, Queensland.

Latham, John Burnside, M.B., B.S., 1945 (Univ. Sydney), c.o. Blackall Hospitals Board, Blackall, Queensland.

### TASMANIA.

THE undermentioned have been registered, pursuant to the provisions of the *Medical Act*, 1918, of Tasmania, as duly qualified medical practitioners:

Gatenby, Harold Bowers, M.B., B.S., 1936 (Univ. Sydney), Launceston.

Sender, Leslie, M.B., B.S., 1938 (Univ. Sydney), Sheffield, Tasmania.

## The Royal Australasian College of Physicians.

### MEETING AT MELBOURNE.

AN ordinary meeting of the Royal Australasian College of Physicians was held at Melbourne on Thursday and Friday, October 10 and 11, 1946.

At the meeting of the General Body of Fellows Colonel J. H. Anderson, C.M.G., C.B.E., of Ruthin, Wales, formerly A.D.G.M.S. attached to the Australian Army Staff in the United Kingdom, and Dr. T. G. Gray, C.M.G., of Wellington,

Director-General of Mental Hospitals, New Zealand, were elected Fellows of the College under Article 40 of the Articles of Association, which provides for nomination by the Council for election as Fellows of such persons as have in the opinion of the Council sufficiently distinguished themselves in any branch of medical science or internal medicine.

At this meeting also the following members were elected and admitted to fellowship of the College: Dr. R. R. Bye, Dr. C. F. A. de Monchaux, Dr. W. P. MacCallum, D.S.O., M.C., Dr. H. Maynard Rennie and Dr. Bruce White, of New South Wales; Dr. Cyril Fortune, of Western Australia; Dr. W. E. L. H. Crowther, of Tasmania; Dr. B. O. Quin, of New Zealand.

The following candidates, who were successful at examinations for membership of the College in Australia and New Zealand, were admitted as members on October 10, 1946: Dr. A. G. McManis and Dr. R. A. Green, of New South Wales; Dr. J. J. Billings, Dr. J. E. Byrne, Dr. J. T. Cahill, Dr. A. H. Campbell, Dr. D. R. Gauld, Dr. H. B. Penfold, Dr. Bruce J. Robinson, Dr. A. Tait Smith, Dr. Ian O. Stable and Dr. Ian A. Wilson, of Victoria; Dr. H. W. Johnson, Dr. Athol Robertson and Dr. W. J. P. Woolcock, of Queensland; Dr. Paul Dorney, of Tasmania; Dr. W. S. Charters and Dr. N. D. McCreath, of New Zealand.

## The Royal Australasian College of Surgeons.

### GORDON CRAIG SCHOLARSHIPS.

THE Council of the Royal Australasian College of Surgeons invites applications for the third award of Gordon Craig Scholarships.

1. These scholarships are awarded for the purpose of furthering post-graduate education in surgery and surgical research.

2. Favourable consideration will be given to applicants who intend to present for a senior surgical qualification.

3. Applicants must have been qualified for at least two years.

4. Scholarship holders will be required to carry out whole-time duty at a medical school and/or research institute and/or hospital, although this condition may be varied in exceptional cases.

5. The amount of each scholarship will be at the discretion of the College, but the College is prepared to grant up to £400 a year to suitable applicants.

6. Forms of application, together with details of the regulations governing the award of the scholarships, are available from the Secretary, Royal Australasian College of Surgeons, Spring Street, Melbourne.

7. Applications should be lodged with the Secretary and should reach him not later than January 31, 1947.

### A POST-GRADUATE COURSE IN SURGERY.

THE Royal Australasian College of Surgeons will conduct in Melbourne a post-graduate course in surgery. It will begin on March 3, 1947, and will cover a period of approximately thirteen weeks. The course is suitable for all graduates who wish to undertake post-graduate study in surgery, and it is not designed solely for those desiring to present themselves for senior surgical qualifications. Lectures and lecture-demonstrations will be arranged in the surgical specialties. These will be announced in detail following the receipt of entries, which close on January 31, 1947. Lectures and lecture-demonstrations in pathology will also be arranged. A detailed syllabus will be available in due course. Inquiries should be directed to the Secretary, Royal Australasian College of Surgeons, Spring Street, Melbourne.

## Obituary.

### ARTHUR FRANCIS KELLY.

WE regret to announce the death of Dr. Arthur Francis Kelly, which occurred on October 18, 1946, at Southport, Queensland.

## Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

- Lake, Max Emory, provisional registration, 1946 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.  
Findlater, James Hilton, M.B., B.S., 1942 (Univ. Sydney), 4, Toongarah Road, Waverton.  
Abramovich, Hyman, M.B., B.S., 1934 (Univ. Sydney), 110, Wiley Avenue, Wiley Park, New South Wales.  
Hume, Patrick Huon, M.B., B.S., 1945 (Univ. Sydney), 26, Woonona Avenue, Wahroonga.  
Lafferty, Kevin Ambrose, M.B., B.S., 1946 (Univ. Sydney), St. Vincent's Hospital, Darlinghurst.

## Corrigendum.

DR. H. F. BETTINGER informs us that in the paper by himself and Dr. Bruce Robinson entitled "The Klinefelter-Reifenstein-Albright Syndrome", which appeared in the issue of this journal of September 28, 1946, an error in the transcription of the report by Dr. A. R. Phillips has remained uncorrected. Ten lines from the end of the first column on page 447, the sentence which reads "His intelligence quotient was 91% (normal, 99% to 110%)" should read "His intelligence quotient was 91 (normal, 90 to 110)". Dr. Bettinger and Dr. Robinson wish to apologize to Dr. Phillips for this oversight.

## THE FEDERAL MEDICAL WAR RELIEF FUND.

THE following contributions to the Federal Medical War Relief Fund have been received:

### South Australia.

- F. S. Hone, R. N. Reilly, J. D. Mill, R. J. de N. Souter, £10 10s.  
H. Halloran, £10.  
A. F. Hobbs, L. J. T. Pellew, £5 5s.  
Sir Henry Newland, £5 (second contribution).  
G. McL. Turnbull, G. M. Hone, F. W. A. Ponsford, £3 3s.  
W. F. Salter, C. B. Sangster, G. L. Bennett, £2 2s.  
T. A. R. Dinning, M. Y. Shepherd, Anonymous, £1 1s.  
Total: £86 8s.

### Tasmania.

- T. R. Gaha, £10.  
Total: £10.  
Grand total: £15,168 7s. 6d.

## Medical Appointments.

Dr. Thomas Hamilton has been appointed deputy quarantine officer under the *Quarantine Act*, 1908-1924.

Dr. Clyde Cornwall Fenton has been appointed quarantine officer under the *Quarantine Act*, 1908-1924.

Dr. Desmond Gerald Sisley has been appointed deputy quarantine officer at Thursday Island under the *Quarantine Act*, 1908-1924.

Dr. H. R. Hill has been appointed Government Medical Officer at Coonabarabran, New South Wales.

Dr. R. D. Wright has been appointed a member of the Dietitians Registration Board under Section 3 (2) (a) of the *Dietitians Registration Act* (No. 4942) of Victoria.

## Books Received.

"Gynaecological Endocrinology for the Practitioner", by P. M. F. Bishop, D.M. (Oxon.); 1946. Edinburgh: E. and S. Livingstone Limited. 7½" x 5", pp. 132, with illustrations. Price: 7s. 6d.

"A Handbook of Radiography" by John A. Ross, M.A. (Cambridge), M.R.C.S. (England), L.R.C.P. (London), D.M.R.E. (Liverpool); Second Edition; 1946. London: H. K. Lewis and Company Limited. 8½" x 5½", pp. 174, with many illustrations. Price: 10s. 6d.

"Australia in World Affairs", by the Right Honourable H. V. Evatt, M.P., with a foreword by the Honourable Sir Frederic W. Eggleston, Kt.; 1946. Sydney, London: Angus and Robertson Limited. 8½" x 5½", pp. 228. Price: 10s. 6d.

## Diary for the Month.

- Nov. 5.—New South Wales Branch, B.M.A.: Organization and Science Committee.  
Nov. 6.—Western Australian Branch, B.M.A.: Council Meeting.  
Nov. 8.—Queensland Branch, B.M.A.: Council Meeting.  
Nov. 12.—Meeting of Federal Council, British Medical Association in Australia, Adelaide.  
Nov. 12.—Tasmanian Branch, B.M.A.: Ordinary Meeting.  
Nov. 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee.  
Nov. 13.—Victorian Branch, B.M.A.: Branch Meeting.  
Nov. 14.—South Australian Branch, B.M.A.: Council Meeting.  
Nov. 19.—New South Wales Branch, B.M.A.: Medical Politics Committee.  
Nov. 20.—Western Australian Branch, B.M.A.: General Meeting.  
Nov. 21.—Victorian Branch, B.M.A.: Executive Meeting.  
Nov. 21.—New South Wales Branch, B.M.A.: Clinical Meeting.  
Nov. 22.—Queensland Branch, B.M.A.: Council Meeting.  
Nov. 26.—New South Wales Branch, B.M.A.: Ethics Committee.  
Nov. 27.—Victorian Branch, B.M.A.: Council Meeting.  
Nov. 28.—South Australian Branch, B.M.A.: Council Meeting.  
Nov. 28.—New South Wales Branch, B.M.A.: Branch Meeting.  
DEC. 3.—New South Wales Branch, B.M.A.: Organization and Science Committee.

## Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

**New South Wales Branch** (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

**Victorian Branch** (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

**Queensland Branch** (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

**South Australian Branch** (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

**Western Australian Branch** (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

## Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such a notification is received within one month.

**SUBSCRIPTION RATES.**—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £2 for Australia and £2 5s. abroad per annum payable in advance.

